

APPENDIX 7

Colorado Canyons National Conservation Area Desert Bighorn Sheep Plan Gunnison Sage Grouse Conservation Strategy



Key Big Game Species of the CCNCA
Photo by Terry Bridgman ©

The Desert Bighorn Sheep Plan (1997) and the Gunnison Sage Grouse Conservation Plan Piñon Mesa, Colorado (2000) are included in this appendix as baseline reference materials and are subject to amendment by the Colorado Division of Wildlife. These plans are not considered to be Land Use Planning decisions for the Colorado Canyons National Conservation Area but would provide guidance for cooperative management of these species. Updates to these plans will be reviewed and incorporated as appropriate.

DESERT BIGHORN SHEEP PLAN

COLORADO DIVISION OF WILDLIFE DESERT BIGHORN SHEEP MANAGEMENT PLAN

BLACK RIDGE HERD UNIT REVISION

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Table of Contents

Management Plan Working Group Members/Approval.....	ii
Introduction.....	1
Black Ridge Herd Status.....	2
Black Ridge Herd Unit Boundaries	3
Desired Population Size.....	3
Desert Sheep Population Management Objectives.....	4
Population Size	4
Population Monitoring.....	6
Transplants.....	7
Predation	8
Conflict resolution: domestic/wild sheep concerns	8
Recreation conflicts with desert bighorn sheep	10
1. Devils Canyon.....	12
2. Pollock and Flume Canyons	12
3. Mee Canyon.....	12
4. Rattlesnake Canyon	13
5. Colorado National Monument	13
Habitat Management Objectives.....	13
Bibliography	15
Appendices.....	16-17

MANAGEMENT PLAN WORKING GROUP MEMBERS

This bighorn sheep management plan herd unit revision was completed in conjunction with a public meeting and through a series of formal working group meetings. The working group for this herd unit was assembled in order to provide suitable input from various public and private groups who were interested in the management of both the bighorn sheep and habitat which the sheep utilize.

The working group will, when necessary, facilitate the implementation of the plan, consider issues as they arise and review progress of the plan's objectives.

The working group was composed of the following individuals.

	<u>Representing</u>	<u>Concurrence and Date</u>
Frank Adams	Rocky Mountain Bighorn Sheep Society	<u>Signed May 30, 1997</u>
Mary Clarke	Mesa County Woolgrowers Association	<u>Signed February 2, 1998</u>
Paul Creeden	Colorado Division of Wildlife	<u>Signed April 30, 1997</u>
Van Graham	Colorado Division of Wildlife	<u>Signed April 22, 1997</u>
Hawk Greenway	Rancher -- Glade Park area	<u>Signed July 17, 1997</u>
Warren Gore	Rancher -- Glade Park area	<u>Signed July 7, 1997</u>
Kathleen Hedlund	Sierra Club, Grand Junction	<u></u>
Ron Lambeth	Bureau of Land Management, Grand Junction	<u>Signed May 9, 1997</u>
Patrick Perrotti	Colorado National Monument	<u>Signed</u>
Roberta Snyder	Glade Park citizens' representative	<u>Signed February 7, 1998</u>
Cathie Zarlingo	BLM Resource Advisory Council member	<u>Signed October 3, 1997</u>
Fred Facer	Colorado Mountain Club	<u>Signed September 2, 1997</u>

Other individuals recognized for their support of the working group include:

David Lehmann	BLM, Grand Junction -- facilitator
Judi Lofland	Colorado National Monument, recorder
Robbie LeValley	Colorado State University Extension Service, Delta County
Julie Hansmire	Colorado Woolgrowers Association

Jim Olterman: _____ Signed _____
West Region Terrestrial Wildlife Supervisor, Division of Wildlife

12/21/97
Date

INTRODUCTION

In 1989 the Colorado Division of Wildlife (CDOW) and the Bureau of Land Management (BLM) approved a restoration management plan for desert bighorn sheep in Colorado (CDOW and BLM 1989). This plan was developed to coordinate the establishment of self-sustaining desert bighorn sheep populations in western Colorado.

The 1989 management plan provided broad management guidelines for its implementation. It established population and habitat management objectives for each sheep herd along with the current land use management decisions, monitoring activities, planned actions and coordinated guidelines with other resource programs.

This plan is a revision of the 1989 management plan for the Devils-Mee Canyon unit, which has been renamed the Black Ridge herd to better define the herd's geographic range. The revised plan is a joint effort of the CDOW, BLM and Colorado National Monument (NPS).

Since the original management plan was completed in 1989, the restoration of desert sheep in the Black Ridge unit has not developed as anticipated. It was anticipated sheep transplanted during the initial reintroductions would populate all suitable range from within the Colorado National Monument to the Colorado state line and support a self-sustaining herd. During the late 1980's and early 1990's, it was determined by CDOW that the population had not extended its range west of Mee Canyon. It also appeared that population numbers were not increasing as predicted. The herd was expected to number about 170 animals by 1995; however, estimates ranged from 50 to 100 sheep in 1995.

Four separate transplants of desert bighorn sheep have been made to establish the herd. Three are considered to be founder herd transplants and took place in 1979, 1980 and 1981. Another transplant took place during October 1995 with the objective of extending the range of the established herd. Initially, efforts were made to transplant sheep from the existing Black Ridge herd. This transplant approach failed when suitable trap sites could not be found. An alternate transplant plan was initiated, which involved trapping and transplanting sheep from another state. A request for sheep was made from CDOW to the Nevada Division of Wildlife. This project included an environmental assessment which was completed by the Grand Junction Resource Area of the BLM for the proposed release. The NPS provided funds for this trap and transplant project.

Additional interest in restoring a desert bighorn sheep population occurred during 1995. The NPS indicated an interest in renewing efforts to establish a herd that would inhabit the Colorado National Monument.

This interest from the CNM, as well as heightened public concern about the desert bighorn herd and its management in the Black Ridge area, confirmed to the agencies involved that it would be appropriate to update this section of the 1989 management plan.

It was noted that the plan's development would benefit by more public involvement in the decision-making process.

In October of 1995, action was taken to update the Black Ridge desert bighorn sheep management plan. A desert bighorn sheep working group was formed in order that public interests would be represented in development of the management plan. The working group was composed of various interested individuals who represented a cross section of public and private groups, concerned citizens and landowners. The plan's development would be accomplished in a manner consistent with BLM and NPS rules, guidelines and regulations and would be adopted as a subsection of or an appendix to the BLM Ruby Canyon Management Plan.

This management plan applies only to the desert bighorn population within the identified her unit boundary. If the wild sheep population expands beyond the present boundary, then this plan will not apply to that portion of the population outside the her unit. If this type of expansion occurs, then a revision of this plan or a new plan will be necessary.

BLACK RIDGE HERD STATUS

The current number of desert bighorn sheep in the Black Ridge herd is difficult to determine. Accurately estimating numbers of animals in a free-ranging population is one of the most difficult problems facing wildlife managers. Census techniques are expensive and usually require that a portion of the population be marked in some manner. Often estimates are based on the minimum number of animals known to be alive in a population at a particular time. Minimum numbers may be determined by helicopter sex/age classification surveys and both intensive and extensive ground surveys. The minimum number is simply an enumeration of all the known sheep in the population.

Current estimates for this herd range from 50 to 75 sheep. The population estimates are based on several different indices including classification surveys (helicopter sex and age surveys), aerial and ground counts, and hunter harvest success.

The CDOW conducts classification surveys to obtain information regarding the age and sex structure of the population (Table 1). Surveys are usually conducted by helicopter. This information provides a minimum number of known animals observed during the survey. It also provides data on lamb survival and lamb recruitment into the adult population as well as data on distribution and movements. The sex/age ratios presented in the table are shown as the number of rams and lambs per 100 ewes.

Currently, there is a concern that the Black Ridge desert bighorn population is not growing and expanding its range as anticipated. The short-term objective established in the original management plan in 1989 was to have a population of 170 animals by 1995. This population size has never been reached. Both adult and lamb survival rates are lower than anticipated. The factors that might be influencing this problem are not well known. No widespread disease problems have become evident, although three sheep

skulls have been found that showed signs of chronic sinusitis. Predator populations are not known to have markedly increased. However, it has been well documented in the Black Ridge area that mountain lions have preyed on adult sheep in recent years.

Table 1. Desert bighorn sheep classification surveys for the Black Ridge herd.

DATE	CENSUS COUNT	LAMB:EWE RATIO	RAM:EWE RATIO	CENSUS TYPE
1991 0613	54	53.8/100	42.3/100	hel
1993 0623	39	61/100	8.6/100	hel
1994 0922	20	8.3/100	58/100	ground
1994 1012	31	26.7/100	80/100	hel
1995 0620	25	50/100	100/100	hel

BLACK RIDGE HERD UNIT BOUNDARIES

Generally, the Black Ridge desert bighorn sheep herd unit area is bounded on the north by the Colorado River and the canyons draining into the Colorado River from Black Ridge and the northeast boundary of the Colorado National Monument to Little Park Road, on the east and south by Little Park Road, the southwest boundary of the Colorado National Monument and the Black Ridge Divide, and on the west by the Colorado/Utah state line (Figure 1). It includes the entire Colorado National Monument. This management plan pertains only to lands within Colorado due to jurisdictional boundaries, but a small herd of desert sheep exist in Utah immediately west of the Black Ridge herd in the Marble and Star Canyon area.

DESIRED POPULATION SIZE

Goal: The goal is to establish a self-sustaining desert bighorn sheep population which will persist over time within the Black Ridge herd unit. The population should be large enough to ensure genetic diversity within the sheep herd. This diversity should be enhanced through random individual interchange with other desert sheep populations in both Colorado and Utah. The CDOW, NPS and BLM will coordinate and cooperate with the Utah Division of Wildlife, Utah BLM and NPS Parks in the management of this sheep herd.

Objective: The long-term objective is to manage this herd unit to support a population ranging from 100 to 525 animals.

DESERT SHEEP POPULATION MANAGEMENT OBJECTIVES

Population Size

Management of sheep numbers is essential for long-term survival of the herd. The habitat available for this herd is finite, which limits the maximum number of sheep that can be sustained. Concerns regarding sheep numbers are important with regard to both minimum and maximum numbers.

There is a substantial amount of information available relating to minimum viable population size for wild sheep. If the number of sheep is too low (less than 100), concerns are increased regarding the establishment of a self-sustaining population (Berger 1990). These concerns revolve around genetic diversity and the potential impacts of disease and excessive predation on a small number of animals. Conversely, populations which are too large can adversely impact desired plant community objectives and the domestic livestock industry. Recreational uses would be impacted if the concern for protecting bighorns did not relent commensurately with the increased security of the herd.

Genetic isolation concerns pertain to the level of genetic variation (heterozygosity) in the herd. Low levels of genetic variation may suggest inbreeding is occurring in a population. Inbreeding can result in various types of physiological problems, which are often detrimental to long-term herd survival.

Excessive predation on a small herd, particularly by large carnivores such as mountain lions, can impact the herd's ability to maintain itself. This occurs when annual production in a small herd is unable to keep pace with losses due to predation.

The population objective developed by this plan is a result of both socioeconomic and biological considerations. Some of the socioeconomic considerations include historic uses such as grazing, deer hunting, hiking, horseback riding and other recreational uses, both within and adjacent to the sheep range. Biological considerations relate to the maintenance of healthy vegetative communities and a robust bighorn sheep population. The desired population objective (100-525) reflects a balance between maintaining a viable minimum sheep population and numbers that are too high, which would affect range conditions and other uses.

Minimum population size was determined through a literature review. Symonds and Singer (1995) state that a population of approximately 100 sheep is critical to short-term persistence of a few decades for bighorn sheep. Although, Krausman, et. al. (1993), reports on six populations of less than 50 individuals that persisted for at least 34 years in the southwest United States.

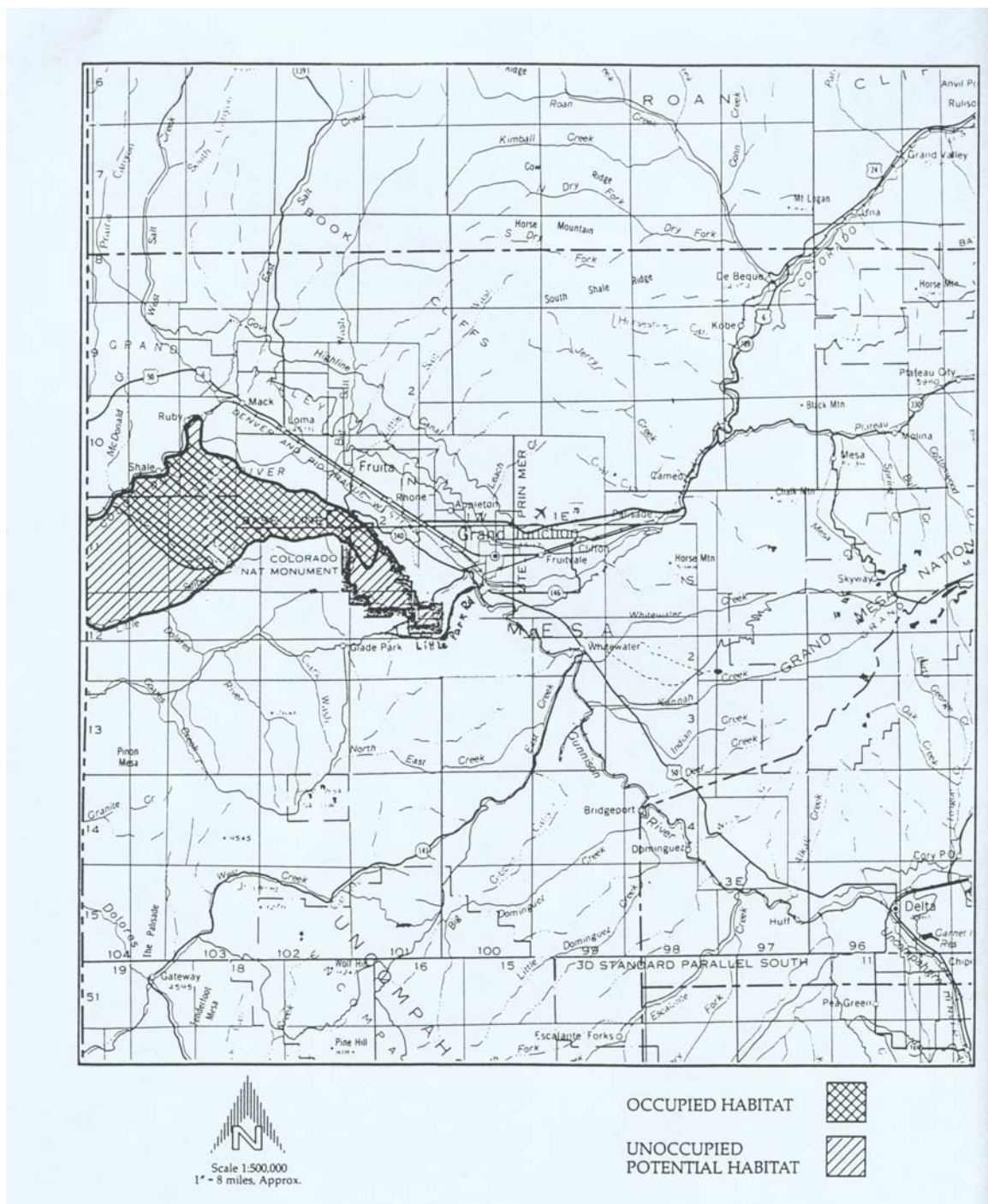


Figure 1. APPROXIMATE BOUNDARY OF BLACK RIDGE DESERT BIGHORN SHEEP HERD UNIT

The maximum population number for this herd was determined using several different analytical techniques, the results of which were then assessed to achieve the most appropriate number. BLM data indicate that there is enough forage to support 853 desert sheep (Appendix A-A). This level of use was determined after the forage allocation for domestic livestock had been subtracted from the total available. The BLM used a second method to determine an upper population limit using a habitat suitability rating system developed for desert bighorn sheep. This method indicated a population of 538 sheep could be supported (Appendix B).

The lower population number derived by the two methods was selected as the upper population objective for this herd. This provides a cushion which will serve to further protect vegetation from over utilization.

If populations remain below 50 sheep through a period of five years it will be necessary to reevaluate this plan and the need to continue ongoing management practices.

The maximum population objective of 525 sheep may need to be decreased if monitoring data, including the condition of the vegetative environment, indicate that sheep numbers are exceeding desired forage use levels. Populations will be adjusted to a desirable level through sport hunting on land other than those administered by NPS.

Population Monitoring

This plan recognizes that the herd's population may fall below 100 animals in the future. This will not jeopardize ongoing management practices including population monitoring, habitat management and hunting seasons. Continued active management of this herd will be based on population monitoring data including:

- a. Population size
- b. Recruitment of young into the adult population
- c. Impacts of predation
- d. Incidence of disease problems

Both resident populations and recently transplanted populations will be monitored. Monitoring will be conducted to determine critical biological components that document the viability of the herds. These components include:

1. Reproductive success as measured by both the number of lambs born and survival through the first year of life. Survival to the first year would be termed recruitment into the population.
2. Sex/age ratio data. This would include the number of rams and lambs per 100 ewes.
3. Survival of adult animals. Including average length of survival in years. Documentation of mortality factors, including predator losses.
4. Movements throughout their ranges relative to times of the year.

5. Delineation and documentation of critical ranges including seasonal use areas (spring, summer, fall, winter), lambing areas, breeding sites, migration corridors, avoidance areas (suitable habitat not used), preferred feeding sites, and escape terrain.
6. Annual population estimates based on the best available data.
7. Assessment of human related impacts, including the impact of dogs (see section below).

Sheep monitoring and population assessment will be conducted using several different methods, these include:

1. Monitoring will be conducted by ground and aerial survey. Aerial survey will be conducted by both fixed-wing and helicopter aircraft. CDOW will provide the fixed-winged aircraft. Helicopters will be contracted when needed.
2. Sheep locations will be filed in a computer database. Locations will be kept by the Universal Transverse Mercator mapping system. Other pertinent biological and physical data regarding sighting locations will also be recorded and stored in the database.
3. Intensity of monitoring will vary based on the biological season of the year. Regular monitoring will be conducted to study the survival and condition of each animal. Schedules will be developed so that data necessary to evaluate study requirements are met.
4. Data will be used to update CDOW Wildlife Resource Information System (WRIS) mapping files. Annual reports will be completed documenting results of field studies.
5. Survival, movements, and mortality will be documented using radiotelemetry when collared sheep are available in the population.

Transplants:

The intent is to establish a self-sustaining population rather than maintaining minimum populations through a series of transplants. Transplants will not be used to increase herd size in the event natural herd production is unable to maintain minimum population size. Also, additional data is needed from population monitoring to clarify the criterion for future transplants.

Currently, future transplants will be considered as follows:

1. To extend the range of the herd to encompass the entire desired unoccupied potential habitat (Figure 1) if sheep do not expand naturally on their own. It has been found that bighorn sheep are often poor pioneers because of social bonding that favors use of established areas (Risenhoover et. al., 1988).
2. To ensure increase heterozygosity if genetic testing indicates that it would be advisable to increase genetic diversity.

The BLM and NPS will complete NEPA requirements for all future transplants on public lands in their jurisdiction. Public involvement will remain an important part of this process.

Predation

Recently acquired data indicate that mountain lions may be having a significant impact on the sheep population. Between November of 1995 and May 1996, seven radiocollared sheep died. Field inspection of the carcasses indicated five were killed by mountain lions; one sheep may have been killed by lion and the last died of unknown causes, but was not likely killed by predators. There is also speculation that a significant portion of the lamb mortality may be attributed to predation, but no definite data are available to support this supposition.

Two recently published reports conclude that mountain lion predation can be a significant limiting factor on herd viability (Boyce et. al. 1996, Ross et. al. 1996). In some cases lion predation on bighorn sheep appears to be largely an individual, learned behavior with some individuals preying heavily on sheep.

This information combined with Black Ridge monitoring data may indicate a similar situation with one or several lions that are having a significant impact on the population. Mountain lion harvest in the Black Ridge area is known to be very low. Hunters and outfitters who guide hunters are reluctant to hunt this area due to the difficult terrain and problems this can cause with pursuit hounds. In recent years the annual harvest quota for mountain lion has not been met in CDOW Game Management Unit 40. Since 1990, 57% (31 harvest/54 quota) of the quota has been taken by hunters. In order to encourage harvest and target mountain lion, several possible alternatives will be explored by CDOW (note: hunting is prohibited within Colorado National Monument). These options include:

1. Encourage outfitters to guide hunters on an "old west" horseback hunt. This type of hunt may appeal to a certain category of hunters.
2. Provide incentives to encourage lion hunting in the Black Ridge area by increasing the bag limit to two lions.
3. If monitoring shows that one or a few lions are causing most of the mortality, then target that lion for harvest. This may include special hunts to target specific animals. As part of ongoing monitoring studies, removing specific lions may help in determining if individual lions may be responsible for much of the predation losses.

Conflict resolution domestic/wild sheep concerns

Considerable controversy, throughout the western U.S., revolves around the issue of potential disease interactions between bighorn and domestic sheep. The issue centers

around the possibility that domestic sheep may transmit diseases to wild sheep populations resulting in large die-offs of the wild herds. Michael Miller, DVM PhD, and CDOW veterinarian, in a letter to the American Association of Wildlife Veterinarians states:

"Pasteurellosis has long been recognized as an important disease of both bighorn sheep and domestic livestock. A pneumonia complex impairs bighorn populations performance throughout North America, and similar respiratory disease complexes plague both cattle and sheep industries worldwide. The bacteria, Pasteurella spp., play a major role in each of these. Wildlife and agricultural professionals share frustration over inability to completely understand and control these complexes" (Miller 1989).

In light of this potential disease dilemma, current recommendations from most wildlife managers encourage, that where possible, bighorns and domestic should not extensively share habitat. However, Miller (1989) further recommends a conservative approach to co-management of domestic and wild sheep. Due to the considerable amount of uncertainty regarding the aspects of disease interchange, Miller concludes that the extent of conservatism in managing these interactions should be decided by local wildlife and livestock professional on a case-by-case basis.

During the course of the development of this management plan, working group members encountered similar controversy regarding this disease problem. Our approach to this problem evolved in the direction of the recommendations that Miller suggested i.e., we decided to deal with the concerns at a local level and recommended the following actions discussed below.

Currently, there is no domestic sheep grazing within the Black Ridge bighorn herd boundaries or adjoining lands to the south. Most of the BLM grazing allotments on lands within or adjacent to the herd area were voluntarily changed from sheep to cattle by the permittees except the Upper Bench, Battleship and 28 Hole allotments which still authorize sheep grazing. There are no limitations or restrictions which would prevent landowners from changing back to sheep grazing on their private land or on BLM allotments which currently authorize sheep use. On BLM lands that were converted to cattle, the permittee would have to obtain authorization to change back to sheep. Large portions of the Black Ridge herd area are not grazed by livestock including the CNM (grazing is prohibited within the boundaries of CNM), major canyon bottoms and the benches above Pollock and Flume Canyons.

In order to minimize conflicts which may be detrimental to bighorn sheep, the following actions should be considered in the event domestic sheep are again grazed in close proximity of the Black Ridge herd. These concepts are predicated on cooperative attitudes and open communications between private landowners, NPS, BLM and CDOW.

It has been noted in the past in the Black Ridge area that domestic sheep have been observed to be spatially close to wild sheep and no known mingling has occurred and with no documented adverse impacts to wild sheep.

1. Natural barriers should be used on BLM lands to maintain separation of sheep in the event that domestic sheep grazing is begun in close proximity to the wild sheep. Both topographic and vegetative barriers should be considered. These will be dealt with on case-by-case basis on allotments. Natural barriers include rocky cliffs, ridges, escarpments and vegetation. Dense pinyon-juniper woodlands should be encouraged in border areas where domestic sheep may be grazed. Both natural and prescribed fire should not be encouraged in these areas.
2. Fencing (conventional livestock), in short segments, should be used to augment natural barriers on BLM lands. Extensive segments of conventional fencing, eight foot, or double fencing is considered too expensive to use over the entire Black Ridge herd unit boundary. CDOW may install fencing if there are consistent problems in localized areas. Movements of other species of wildlife, including deer and elk, should be considered prior to fence construction.
3. Grazing permittees would be allowed to change from cattle to sheep on nearby BLM lands provided a management plan or cooperative agreement is adopted by CDOW, BLM, NPS and the permittee to minimize the risk of mingling of wild and domestic sheep. This also applies to trailing of domestic sheep.
4. Aggressive herding should be used to prevent mingling of bighorns and domestic sheep. As an example, Idaho allows herding dogs to deter bighorns in efforts to discourage mingling. Aggressive herding could include extra herding dogs, extra herders or any other herding techniques applied to reduce the possibility of mingling.
5. The purchase of easements may be used in the event that other methods prove unsatisfactory in maintaining separation between wild and domestic sheep.

The CDOW will respond to the presence of bighorn sheep on private land on a case-by-case basis as it applies to potential disease situations. Capture, quarantine and monitoring (including assessment for research information) will be the first priority in handling situations where there is concern for the welfare of the wild sheep. Euthanasia of wild sheep will be a secondary preference where the health of the entire wild herd may be in jeopardy.

Game damage situations will be handled by the CDOW according to CDOW guidelines.

Recreation conflicts with desert bighorn sheep

Wildlife research and management studies have shown that bighorn sheep can be affected by human use of the environment. Human-wildlife interactions are especially relevant in wilderness areas where resource managers must attempt to provide habitat for species that may be very sensitive to human activities (Hendee et. al., 1990).

In order to avoid impacts detrimental to bighorn sheep, recreational users of the Black Ridge area need information and education regarding wild sheep behavior. Human use of the area may need to be regulated in some manner to further protect sensitive areas.

Additionally, studies (Harris et. al., 1993) have shown that one group in five recreational users was accompanied by dogs in New Mexico. Dogs, by nature, tend to roam extensively when out with recreationists and some may potentially harass or kill wild sheep.

Currently, there are no known areas where direct impact by human use has been detrimental to the Black Ridge bighorn sheep herd. However, recreational use is increasing as people become more familiar with the recreational opportunities that exist in the area.

The amount and intensity of recreational use is important information when evaluating impacts on desert sheep. Additional data should be collected in order to more accurately assess impacts to sheep should they occur. Currently, there are trailhead registration books at Liberty Cap, Monument, Devils and Pollock Canyon trailheads. Data related to recreational use may be collected by the following means:

1. Interested individuals (volunteers)
2. River outfitters
3. CDOW surveys
4. NPS and BLM surveys including additional trailhead sign-in stations
5. Trail and road electronic traffic counters

During this desert sheep planning process specific localities were identified where recreational activities were of concern to desert bighorn populations. Efforts should be directed at minimizing human disturbance in crucial areas, e.g., lambing, rutting and other seasonal concentration areas.

Implementation of proposed management actions initially will be done through information and education programs. More formal regulations may be necessary if voluntary compliance efforts are unsuccessful.

Informational brochures will be prepared and distributed by CDOW, NPS and BLM which will include information regarding desert bighorn sheep protection, management and viewing. This information on management will be sent to appropriate recreational users including hiking and climbing organizations, professional commercial users, outdoor equipment retailers and at the Glade Park Store. River outfitters will be asked to assist in protecting important desert sheep areas and habitat.

Potential Recreational Conflict Areas

1. Devils Canyon - This area receives approximately 6,000 recreational visits per year. Most of the activity is in the form of recreational hiking (75%). Almost a third of the use occurs during the month of May. There is the potential for commercial recreational rock climbing to occur on the canyon walls. Devils Canyon is used year-round by desert sheep. It is also a known lambing area. Impacts would be to lambing and disruption of the overall use of the canyon by sheep.

Management Direction

- a. Hiking in the main canyon is acceptable. Hikers will be encouraged to hike only as far as the old BLM cabin.
 - b. Hiking in the side canyons will be discouraged, particularly during lambing season from April 1-June 1 each year.
 - c. Rock climbing should be encouraged at alternative sites away from Devils Canyon. Commercial permits for climbing and horseback riding need stipulations for seasonal restrictions--April 1 - June 1 annually for lambing season.
 - d. Installation of information signs at Devils Canyon trailhead and old cabin.
2. Pollock and Flume Canyons - This area receives approximately 5000 recreational visitors per year. Roughly half are mountain bikers, the remaining half are hikers and horseback riders. These canyons are used by bighorn sheep, particularly both forks of Pollock Canyon. Lambing is known to occur in these areas. Concerns are associated with the Pollock Bench bike trail and increased hiking into the canyons.

Management Direction

This area will be monitored to determine if recreational use is at levels which may adversely impact bighorn sheep. If problems occur, then seasonal closures and other management may be necessary.

- a. CDOW remote monitoring of sheep use
 - b. BLM trailhead monitoring station (sign-in trail book) and trail traffic counter
3. Mee Canyon - This remote area is a desirable destination site for hikers due to its unique geological features, including the alcove in the upper portions of the canyon. Desert bighorn sheep inhabit the entire canyon as well as the alcove area. Public use (number of visits) to the alcove site is unknown, but has increased significantly in the last five years. A lack of escape routes above the alcove may limit sheep use if recreational activities are excessive.

Management Direction

The Mee Alcove Trail and signing issues are being addressed in the Ruby Canyon Plan. The management practices included in this plan should be implemented for management of desert bighorn sheep.

4. Rattlesnake Canyon - This canyon is important bighorn sheep habitat. It is both a lambing area and year-round use area.

Management Direction

Construction and maintenance of an information trail sign at the "T" in the road near the heads of Mee and Rattlesnake canyons.

5. Colorado National Monument - Bighorn sheep are often found using western portions of the Monument. Most commonly sheep are observed in Monument, Fruita and Kodols Canyons, as well as along the historic Rim Rock Drive. Visitors are known to get out of their vehicles and disturb wild sheep. This is for the most part unintentional.

Management Direction

Educate visitors through interpretive programs and brochures as to the sensitivity of wild sheep to humans. Encourage visitors to view sheep at appropriate distances and from their vehicles.

HABITAT MANAGEMENT OBJECTIVES

Management of the habitat on Black Ridge is essential for maintenance of the ecosystem. Similarly, habitat management is an important part of maintaining desert sheep populations. Currently, the BLM is in the process of developing a management plan for the Ruby Canyon area, which encompasses most of the Black Ridge desert sheep range. During the development of the Ruby Canyon Plan, desert bighorn sheep habitat concerns and requirements are being considered. Therefore, this desert bighorn management plan will comply with recommendations and decisions developed for habitat management in the Ruby Canyon Plan.

The Ruby Canyon Plan will address but is not limited to road management, desired plant community characteristic, natural fire management, and recreation management.

As wild sheep habitat within Colorado National Monument is being managed as a natural ecosystem, no habitat management improvements are contemplated.

Grazing Management (BLM)

Cattle grazing is one of the many uses occurring in the Black Ridge area outside of Colorado National Monument. During the development of bighorn sheep population objectives, bighorn forage availability was determined after domestic livestock consumption was considered. Grazing management is addressed in allotment management plans developed by the BLM.

Natural Fires

Natural fire, except for bighorn vegetative barriers, will be encouraged on BLM lands as directed in the Ruby Canyon Management Plan. In critical bighorn sheep use areas, increasing the amount of open visual distance in the pinyon-juniper habitat would be a desirable goal. All natural fires are suppressed on Colorado National Monument lands. However, future prescribed fire management plans may amend this policy.

Habitat Improvement Projects

Limited opportunities exist within the National Monument and BLM Wilderness Study area for habitat alteration or augmentation. However, removal of man-made obstacles such as old fences may be appropriate in both areas. Small scale water developments are appropriate for BLM WSAs and two presently exist.

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APPENDIX A. ESTIMATION OF CARRYING CAPACITY - METHOD 1

Allotment	Total Available Forage (lbs)	Allowable Use (50%)	Authorized Livestock AUMs	Livestock Forage (lbs)	Forage Available After AUMs (lbs)	Sheep Capacity (#)
Mtn Island	2,938,680	1,469,340	1,180	920,400	548,940	304
CO Ridge	1,108,478	554,239	659	514,020	40,219	22
Rattlesnake	143,699	71,850	21	16,380	55,470	31
Little Dolores Bench	304,389	152,194	97	75,660	76,534	43
Black Ridge	551,984	275,992	459	358,020	0	0
Radio Tower	157,201	78,600	119	92,820	0	0
Upper Bench	932,589	466,294	328	255,840	210,454	117
Burke	217,229	108,615	100	78,000	30,615	17
Knowles	361,057	180,528	234	182,520	0	0
Lower Bench	1,367,388	683,694	1,400	1,092,000	0	0
Unalloted	1,148,163	574,082	0	0	574,082	319
				Total	1,536,314 lbs	853

Total Available Forage. Forage available for bighorn sheep and livestock.

Allowable Use: 50% of Available

Livestock Forage: AUM's x 780 lbs. of forage per AUM

Forage Available After AUM's: Allowable Use - Livestock Forage

Sheep: Forage Available After AUM's divided by 1800 lbs. of forage per sheep per year

Note: analysis does not include lands within Colorado National Monument

Appendix B. Estimation of desert bighorn sheep carrying capacity - Method 2

To estimate the carrying capacity of the Black Ridge desert bighorn sheep herd's range, the following publication was used:

Armentrout, D.J., and W.R. Brigham. 1988. Habitat Suitability Rating System for Desert Bighorn Sheep in the Basin and Range Province. BLM Technical Note 384. 18pp.

The method considers 10 habitat variables to derive a factor that rates the quality of the range. This factor used with size of the range and the estimated density of bighorns on the best ranges yields the estimated carrying capacity of the range. The rating system was modified by using the arithmetic mean of the weighted variables, called Weighted Indices (WIs), instead of using the geometric mean. The concept of the geometric mean is that the habitat suitability rating factor must be less than its weakest WI. This negates the weight of the other habitat variables. This seems extremely conservative and would imply that the existing herd is impossible.

The following habitat variable and the scores are averages for the existing and designated potential range of the Black Ridge herd of desert bighorn sheep.

<u>Suitability Index Variable (SIV)</u>	<u>Rating & Description</u>
1. Topography	.70 mesas & Canyons
2. Water, amount & permanence	.70 average site dry 25% of all years
3. Water, distance	.80 distance from escape terrain
4. Water, competition	.50 some big game and livestock
5. Visual obstruction	.70 at distance 50' & height 3' > 60% of object visible
6. Water, distribution	.35 percent of area within mile of H2O
7. Forage areas	.70 forage rating for majority of range
8. Vegetation condition	.75 late seral stage
9. Space--human conflict	.70 medium use, restrictions, no economic change
10. Domestic sheep, distance	.10 usually less than 5 miles

Weighted Indexes

Cover(WIC) = SIV#1 = 0.70

Water(WIW) = $SIV\#2(SIV\#3+SIV\#4+SIV\#5+SIV\#6)/4 = 0.41125$

Forage(WIF) = $(SIV\#3+SIV\#5+SIV\#7+SIV\#8)/4 = .7375$

Human(WIH) = SIV#9 = 0.70

Sheep, Domestic(WIS) = SIV#10 = 0.10

Habitat Suitability Rating(HSR) = $(WIC+WIW+WIF+WIH+WIS)/5 = 0.53$

Total Square Miles(TSM) = 145 = 93,000 acres

Occurrence(OCC) = optimum # of bighorn sheep per square mile, from literature=7.0

Carrying Capacity = $HSR \times TSM \times OCC = 538$ desert bighorn sheep

Note: analysis includes lands within the Colorado National Monument

GUNNISON SAGE GROUSE CONSERVATION PLAN PIÑON MESA, COLORADO

Prepared by:
Piñon Mesa Gunnison Sage Grouse Partnership

Last Revised: 24 May 2000

GUNNISON SAGE GROUSE CONSERVATION PLAN PIÑON MESA, COLORADO Final Plan

Prepared by:
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Last Revised: 24 May 2000

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PREAMBLE

Sage grouse are restricted to sagebrush rangelands in western North America and occur nowhere else in the world. Their distribution and abundance have markedly decreased and the species has been extirpated from at least 5 states and 1 province, and their long-term existence in at least 6 states and 2 provinces is uncertain. This uncertainty has resulted in public discussion of classifying sage grouse as federally threatened or endangered. Complicating the concern about status of sage grouse is the recent description of a new species of sage grouse from southwestern Colorado and southeastern Utah, the Gunnison sage grouse. This newly described species has a limited distribution in Colorado (Figure 1), a relatively small population size, and may become a candidate for federal listing as threatened or endangered. Five listing factors (Appendix D) are considered by the U.S. Fish and Wildlife Service (USFWS) in evaluating possible action under the Endangered Species Act.

Gunnison sage grouse are known to occur in 9 highly fragmented populations in scattered localities in southwest Colorado and southeast Utah. The largest area of contiguous distribution and, consequently, population size of this new species is in the Gunnison Basin, Colorado. One of the populations is no longer viable (Sims Mesa, less than 10 birds), another (Poncha Pass) is the result of a transplant, 2 others, Dove Creek and Monticello are undoubtedly linked (2 states), while 1 (Cimarron) is marginal (less than 50 birds). The population at Piñon Mesa is estimated to be at least 75-100 birds. The Crawford population, while small (225 birds), has increased since 1994 and probably has a relationship with the larger population in the Gunnison Basin.

Conservation plans provide unique opportunities for partnerships involving resource agencies, private groups, and individual landowners to work jointly for more effective conservation of candidate species and land management. Presently, conservation plans have been completed for Gunnison sage grouse populations at Crawford, Dove Creek, Dry Creek Basin/Miramonte, Poncha Pass, and the Gunnison Basin, and are being implemented. The goal is to have conservation plans for each of the populations that are believed to be viable. Hunting is presently allowed under tight restriction only in the Gunnison Basin with none of the other populations being hunted nor considered for future hunting opportunities.

This conservation plan addresses the 5 USFWS listing factors, and describes and sets forth a strategy for long-term management of the Gunnison sage grouse in concert with other resource values and land uses at a landscape scale. It is the intent of the Piñon Mesa Sage Grouse Partnership to frequently communicate with other Gunnison Sage Grouse Work Groups to seek and exchange information as progress is made on implementing the conservation actions. Participation by private landowners in this conservation plan will be strictly optional on a volunteer basis.

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	THE PLAN AND ITS PURPOSE	1
III.	SPECIES DESCRIPTION, DISTRIBUTION, AND POPULATION MONITORING	2
	A. Description	2
	B. Distribution	2
	C. Population Monitoring	3
IV.	THE PIÑON MESA ENVIRONMENT	3
	A. Geography	3
	B. Vegetation	3
	C. Piñon Mesa Sage Grouse Area Boundary	5
	D. Sage Grouse Population and Habitat Status/Distribution	5
	E. Habitat Requirements of the Gunnison Sage Grouse in the Piñon Mesa Area	9
V.	CONSERVATION STRATEGY	10
	A. Piñon Mesa Goals and Objectives	10
	B. General Conservation Objectives	11
	C. Issues or Factors That Affect Sage Grouse Populations And Their Habitat	13
VI.	CONSERVATION ACTIONS AND IMPLEMENTATION	19
VII.	MONITORING AND EVALUATION	20

LIST OF TABLES AND FIGURES

Figure 1.	General Location of The Five Largest Populations of Gunnison Sage Grouse in Colo.	ii
Figure 2.	General Location of Piñon Mesa and Glade Park in Western Colorado	4
Figure 3.	Gunnison Sage Grouse Historic/Habitat Boundary and Present Range in Westcentral Co. .	7
Figure 4.	Gunnison Sage Grouse Habitat	14-15
Table 1.	Piñon Mesa Sage Grouse Conservation Actions, and Implementation Schedule	21

APPENDICES

APPENDIX A:	Glossary	26
APPENDIX B:	Listing Factors	27
APPENDIX C:	List of Working Group Participants	29
APPENDIX D:	Signature Page	30
APPENDIX E:	Male Sage Grouse Counts	32

I. INTRODUCTION

Piñon Mesa is at the northwest end of the Uncompahgre Plateau in west-central Colorado. The area is known widely for its scenic qualities, abundant wildlife, and diverse vegetative communities. The relatively small human population has left much of the countryside in its native characteristics which offers expansive views of western Colorado and eastern Utah. Generally, the land is used for livestock grazing. In the past, domestic sheep were grazed, but today most of the ranches maintain cattle as the primary livestock.

The area where Gunnison sage grouse presently occur or have been found in the past is commonly referred to as Piñon Mesa or Glade Park and the terms are often used interchangeably. Glade Park is usually considered to be lands at lower elevation on the north half of the area, in and around the Glade Park store, but extending west to Fish Park near the Utah state line. Piñon Mesa, at higher elevations, is considered to be in the central to southern portion of the area. For this plan, the entire area will be referred to as Piñon Mesa, since this area presently supports the largest portion of the Gunnison sage grouse population in this area.

For centuries the Gunnison sage grouse, sometimes called a sage hen, has made its home in this area. Populations most likely fluctuated over the years in response to the ebb and flow of natural fires that formed the necessary sagebrush communities that are essential to these birds. At times in the past, the habitat must have looked somewhat different than it does presently. For the sage grouse to survive, it is assumed that the vegetative communities must have been more open, with less piñon-juniper woodlands and perhaps fewer areas dominated by oakbrush and serviceberry. In fact, the isolated populations of Gunnison sage grouse that exist today in southwest Colorado were likely connected in a web of sagebrush that allowed for movement of birds between populations which allowed for genetic intermingling that contributed to the characteristics in the birds we see today. At some point in the past (estimated at 300,000 years) these birds separated from their sage grouse relatives to the north and evolved to where these birds are considered a separate species today.

In the recent past, records show that sage grouse populations had a wider range than we see today on Piñon Mesa. Glenn E. Rogers, a CDOW biologist, reported active grouse leks south and west of the Glade Park store in the 1960s, and members of the Mesa County Audubon Society reported seeing birds near historic lek sites near Thompson Reservoirs up until a few years ago. Local ranchers have also reported seeing sage grouse in the last 10 years. Intensive studies by the CDOW in the mid-1990s tend to support the theory that the bird's range is contracting, with only the most favorable habitats on Piñon Mesa being used today. No confirmed sightings have been recorded near the Glade Park store portion of the Mesa for more than 10 years. It is probable that viable populations of the birds have vanished from this area. Fragmentation of habitats by urban growth and progression towards older-aged vegetation appears to be the primary reasons for the decline.

II. THE PLAN AND ITS PURPOSE

This conservation plan establishes a process and puts in place a framework that will guide a coordinated management effort at a landscape scale directed at improving sage grouse habitat and reversing the long-term trend of declining numbers, while continuing to optimize management for the other resources. Central to this process is landowner, community, and agency involvement in determining appropriate management activities designed to meet jointly developed goals and objectives.

The plan is designed to be dynamic and flexible, allowing new information and issues, as well as results from previous conservation efforts, to be incorporated as necessary. It is also designed to answer questions and collect data for future resource management decisions.

Guiding Principles

This process is designed to guide sage grouse and other resource management efforts, particularly developing goals, objectives, and the selection of conservation actions and the way in which they are implemented across jurisdictional/ownership boundaries. They are:

1. Landowner and public involvement is essential in all planning and management decisions.
2. Maintain an atmosphere of cooperation and participation among land managers, private landowners, and other stakeholders.
3. Implement conservation actions in ways that meets the needs of sage grouse and other resources, and are least disruptive to, and encourages the development of a stable and diverse agricultural base in the area.
4. Respect individual views and values and implement conservation actions on a collaborative basis in ways that have broad community support.
5. Make every effort among partners to seek efficiency and integration of efforts, and to select conservation actions that also promote other land health or resource management objectives whenever possible, especially among agencies in the implementation of conservation actions.
6. Active management of the habitat on Piñon Mesa is essential for the perpetuation of sage grouse populations. The elimination of planned management and manipulation of habitats is not desirable and closing of lands to management would adversely impact sage grouse, present agricultural practices, and other wildlife populations.

III. SPECIES DESCRIPTION, DISTRIBUTION, AND POPULATION MONITORING

A. DESCRIPTION

Gunnison sage grouse are large (2.4-5.0 lbs) brownish gray birds, sometimes called a sage hen due to its resemblance to domestic chickens. The grouse have narrow pointed tails, feathering to the base of the toes, and a diverse pattern of grayish brown, buff and black on the upper body. The flanks are pale gray and white, and there is a large dark patch extending across the lower breast and abdomen. Adults have dark green feet and toes. In early fall, a comb-like fringe appears along side each of the 3 toes which then act as snowshoes for walking on deep snow. These fringes are shed in the spring. Males are larger and more colorful than females and have a black throat and bib, and white feathers along the sides of the neck. Males also have 2 large, frontally directed air sacs of olive-green skin that they inflate during breeding displays. Both sexes have yellow-green eye combs, but these are less prominent in females.

Gunnison sage grouse, in southwestern Colorado, differ from sage grouse found in northern Colorado in size (males are 3.5 to 5.0 lbs, vs. 5.5 to 7.2 lbs in northern Colorado; females are 2.4 to 3.1 lbs vs 3.3 to 4.0 lbs in northern Colorado), bill shape and size, and tail patterns (larger, more distinct white barring of tail feathers). Also, the difference in behavior and calls between the Gunnison and large-bodied sage grouse in Northern Colorado are striking.

B. DISTRIBUTION

Two races of sage grouse have been described with the Western race occurring in west-central Oregon and Washington and the Eastern race from eastern Oregon east, north, and south throughout the described distribution. More recently, a third group of sage grouse has been described from the Gunnison Basin, Colorado. This group differs from all other sage grouse populations studied by being significantly smaller in size, having different breeding behaviors and specialized feathers, and having a markedly narrow (one) range of genetic haplotypes. The present distribution of the Gunnison sage grouse is south of the Colorado-Eagle rivers in

Colorado extending east to the San Luis Valley. It also occurs east of the Colorado River in extreme southeastern Utah near Monticello.

C. POPULATION MONITORING

Counts of male sage grouse on leks provide wildlife managers with an estimate of minimum population size. Studies across western North America indicate there are about 2 females for each male in the spring population. Thus, if the number of males is known it is possible to calculate a minimum population size. It is important to recognize that a count will not represent all males in the population and that any calculated population estimate will be lower than the actual population size.

Personnel of the CDOW inventoried leks starting in the 1950s to document sage grouse presence and general trend within specific areas of western Colorado. Thus, locations of active leks and counts of males on leks were recorded. Generally, only accessible leks were counted and intensive searches for new or relocated leks were not made because of manpower and equipment priorities. Searches and counts were sporadic as firm procedures were not in place. Consequently, lek count data prior to 1995 for Piñon Mesa reflect only general trends in the sage grouse population. Procedures changed in the mid 1990's and now follow standard protocols. Sage grouse were counted on leks in Glade Park (leks 1-4) in 1958-1960 with 0 to 6 males/lek and Piñon Mesa (leks 1-2) with 0-17 males/lek. No other lek count data for this area are known to be available until 1988 and 1995-2000.

IV. THE PIÑON MESA AREA ENVIRONMENT

A. GEOGRAPHY

The area can be broadly divided into 2 sub-units: These include, Glade Park, north and west of the Glade Park store, and Piñon Mesa at higher elevations, rising to the south and west of Glade Park. The area is also sometimes called either Glade Park or Piñon Mesa and terms are often used interchangeably (Figure 2). Glade Park is at the extreme northwest end of the Uncompahgre Plateau. The topography varies greatly and highest elevations are near the center of the area and from there elevation decreases in all directions. It is noted for its canyon country, which is conspicuous near the area's borders. The highest elevation is around 9,800 feet on Piñon Mesa. The lowest elevation is about 4,600 feet where the Colorado River meets the Utah State line.

Sandstone canyons are one of the dominant geologic features in this area. The Colorado National Monument just southwest of Grand Junction is noted for its expansive sandstone canyon system. The interior portions of Piñon Mesa are composed of mesas and canyons, but the general terrain is less fragmented and more open in nature.

The Little Dolores River is the main drainage that originates in the area. Due to the significantly higher elevations in the center of the area, considerable moisture falls throughout the year and perennial streams are not uncommon. There are no large natural lakes in the area. Small reservoirs have been constructed for livestock and irrigation water and for municipal use by the town of Fruita.

B. VEGETATION

Vegetation in this area varies due to the wide range of elevations that occur. At lower elevations, the vegetation is typical of most semi-arid regions in western Colorado. Saltbush, sagebrush, and greasewood are common shrub species in the open desert areas. Piñon-juniper woodlands dominate on the lower and intermediate slopes throughout the area. Oakbrush occurs in the piñon-juniper woodlands at higher elevations. A combination of sagebrush and snowberry occurs in open areas in the oakbrush zone at intermediate and higher elevations. Higher elevations, which receive substantially more moisture, have considerable aspen and spruce-fir forests.

Vegetative communities grade into each other in response to slope, aspect, and moisture conditions forming a mosaic pattern. In portions of the area, ponderosa pine is a dominant tree and some mature stands have been harvested for timber in the past.

Irrigated grasslands interspersed with shrub mixtures and grass/alfalfa meadows occur at lower elevations in the valleys. Cottonwood, willow, sagebrush, and greasewood are common in riparian areas throughout the area. Other riparian species include boxelder, tamarisk (salt cedar), and alder.

The vegetation in the area has been extensively managed for sustained livestock forage production. Cattle grazing occurs throughout the area and historically domestic sheep were grazed in significant numbers. However, today domestic sheep occur in only a few small flocks on small ranchettes.

The vegetation in the area has been influenced by man's management practices, agricultural and livestock production, and recreation. Natural fire has been excluded from many portions of the unit for many years. However, several large wild fires have occurred in the last 10 years, mostly in the southwest portion of the area near the Utah state line. One large fire occurred during 1989 in the Clark Wash area near the Glade Park Store. These lightning-caused fires burned extensive stands of mature piñon-juniper woodlands. Piñon-juniper invasion of the sagebrush steppe due to the lack of fire is a significant concern and is influencing wildlife populations in the area. In some areas it is reducing the amount of forage produced by shrubs, grasses, and forbs.

C. PIÑON MESA SAGE GROUSE AREA BOUNDARY

The Partnership considered possible boundaries for the Gunnison sage grouse population that historically and presently use the Piñon Mesa area. Delineation of an area boundary was based on known historic use sites and sage grouse observations, as well as the present potential of remaining sagebrush-dominated habitats (Figure 3). Areas with rural dwellings are included within the boundary. While this was necessary to include all areas with potential for habitat development to benefit an expanded Gunnison sage grouse population, no inferences on future changes in present land uses are inferred by the boundary delineated. Participation in this plan on the part of landowners is strictly voluntary.

Generally, Black Ridge forms the northern boundary of the area. The northern boundary continues eastward along the southern boundary of Colorado National Monument to the Tabogauche Trail. From there, the Tabogauche Trail drops south and forms a portion of the east boundary with the remaining portion being a continuation of a north-south line paralleling the trail down to Unaweep Canyon. Unaweep Canyon is the southern boundary and is a well known geologic feature. This canyon is broad, steep-sided and composed of both granite and sandstone formations. It is unique in that its highest point is near the canyon's center and water drains from this site along East and West creeks. The Dolores River flows for a short distance along the southern boundary near the town of Gateway, Colorado. The Utah State line is the west boundary. However, Gunnison sage grouse inhabit the western portion of Fish Park, which lies in Utah.

D. SAGE GROUSE POPULATION AND HABITAT STATUS/DISTRIBUTION

Population Status:

The present (1997-99) size of the breeding population of sage grouse in the Piñon Mesa area is estimated to be between 78 and 123 birds based on 26 males counted on 4-5 active leks (1997-99) (3 year average) on which males were observed (Appendix E). This range is based on knowledge that there are about 2 hens/males in the spring population (26 males + 52 hens = 78). Thus, there were at least 78 sage grouse in the Piñon Mesa area in May 1999. However, this estimate may be conservative as it has been repeatedly demonstrated that not all males are on leks at one time to be counted and, also, that locations of all active leks may not be known. Given the terrain and early spring access in this area, it is probable that not all active lek areas were known and counted in spring 1997-99. If we assume that locations of 90% of all leks were known, there could be 1 unknown active lek

(if 5 active leks = 90%, then $5 \div 0.90 = 5.5$ active leks would constitute 100% of all active leks). To reach an upper estimate of population size, the 5.5 calculated active leks was rounded to 6.

Given an average of 26 males counted on 5 active known leks, there would be 31 males on 6 active leks ($26 \div 5 = 5.2$ males/active known lek \times 6 assumed leks, $6 \times 5.2 = 31.2$ rounded to 31). Further, given that not all males associated with a lek are counted on one count day, it is reasonable to assume the actual number, based on data from radio-marked males, lies between 50 and 100%. Assuming this percentage to be 75, there would be 41 males ($31 \div [0.75 \text{ on 6 possible leks}] = 41$). Thus, if there are 2 hens/male in the spring population, the upper estimate for the population would be 123 ($41 + 82 \text{ hens} = 123$).

There are problems with both lower and upper estimates as sex ratios may be closer to 1:1 (one male for every female) in unhunted populations and all active lek sites may be known and counted. However, it is probable that the true population number lies within the range calculated and, most likely, is closer to the lower estimate.

The spring population size of sage grouse at Piñon Mesa has been considerably higher in the recent past (34 males counted in 1959 on 3 active leks). These numbers, using the same assumptions, would indicate a spring population size of at least 102 birds ($34 \text{ males} + 68 \text{ hens}$) and possibly as high as 264 birds ($34 \div 3 = 11 \times 6 \text{ total leks} = 66 \text{ males} \div 0.75 = 88 + 176 = 264$). Thus, population size has decreased from 1959 (102-264, 11 males/lek) to 1997-99 (78-123, 5 males/lek). This is a 54% ($11 - 5 = 6 \div 11 = 54.5\%$) decrease based on mean number of males counted on leks.

Habitat status: It is believed that the decline in the Piñon Mesa sage grouse numbers reflects a larger decline in the condition of the natural landscape in this area. Past management activities including fire suppression and selective livestock grazing appear to have created conditions suitable for establishment of young piñon and juniper trees which are slowly encroaching into sagebrush areas on the landscape, as well as creating old-age, dense shrub growth. Assessment of the potential natural disturbances in the area indicates that the plant communities and grouse evolved under a system of fairly frequent, low intensity fire and primarily dormant season grazing and browsing by native ungulates. This would have led to a highly patchy landscape with many different age groups of vegetation and high levels of herbaceous growth and ground cover. Sage grouse habitat objectives in this plan represent small steps toward this more functional landscape pattern, and are compatible with a move toward greater landscape health.

Specific habitat problems identified by the Partnership are: 1) In the Glade Park area, fragmentation of habitat components, i.e., too much distance between nesting and brooding areas, and wet areas and by housing development; 2) invasion of piñon and juniper into the sagebrush areas throughout most of the area; 3) not enough grass and forbs in the sagebrush understory in Glade Park; 4) low vegetative age class diversity throughout the area (a homogeneous old age stand exists); 5) low vegetative vigor, particularly in Glade Park; 6) poor vegetative conditions on leks (too much vegetation greater than 8" high); and 7) a short supply of wet areas and water sites in Glade Park.

Population and Habitat Distribution: It is believed that historically Gunnison sage grouse occurred in all suitable sagebrush habitat in the Piñon Mesa area. Thus, based on the existing location of sagebrush, suitable soil types that may have supported sagebrush in the past, and the knowledge of present sage grouse use areas, the probable historic and present distribution of sage grouse was developed (Figure 3 and 4).

Four types of sagebrush occur on Piñon Mesa. Silver sage is the dominant species on Piñon Mesa where a large portion of the occupied sage grouse range occurs. In this area, some mountain big sagebrush is scattered among the silver sage on elevated, dryer, rocky sites. Silver sagebrush is used by sage grouse extensively along both sides of the MS road on upper Piñon Mesa. However, it is considered to be less palatable than mountain big sagebrush to sage grouse. Thick stands of snowberry occur in conjunction with silver sagebrush on Piñon Mesa. Both silver sage and snowberry are fire tolerant species. On the mesas extending north of the MS road, such as Payne Mesa, mountain big sagebrush is the dominant sagebrush. Mountain big sage is important for the

Gunnison sage grouse and is the preferred forage species. It is considered to be the most important winter food for sage grouse in this area.

Basin big sagebrush occurs more commonly in the Glade Park area and usually occurs along drainages and often, fence lines. It grows up to 10 feet high and is a dominant shrub along many of the small, dry washes and gulches. Basin big sage provides little habitat for sage grouse.

Black sagebrush is found scattered throughout the area. It tends to be found in dryer and sometimes rocky areas. One area where black sage is found is near Unaweep Canyon on Snyder Flats and this area is considered to be historic range for sage grouse. Some black sage is found northeast of Payne Mesa in the upper portions of the Little Dolores River drainage.

The CDOW believes from recent inventories in the eastern Glade Park area that a viable population of sage grouse no longer exists there. No birds have been observed at identified lek sites and extensive work by Chris Woods (CDOW temporary research worker) in 1995 revealed no observations of sage grouse. In the past, the eastern Glade Park area most likely supported a year-round population and may also have functioned as winter range for birds which migrated back and forth from Piñon Mesa. This is speculation, but migratory movements of similar distances presently occur in the Dry Creek Basin/Miramonte population of Gunnison sage grouse. Migratory movements of this type may have benefited the Piñon Mesa grouse, allowing breeding and brood rearing at higher elevations and increased winter survival by moving to lower elevations where snow depths were less and forage more widely available.

Sage grouse numbers at Fish Park, near the Utah/Colorado state line have declined to very low levels and may have reached a point that a viable population no longer exists there. One bird was observed at Fish Park in 1998 and none in 1999. No birds have been observed on the lek since 1995. Very limited numbers of sage grouse have been observed using hay meadows along the DS road near the point where it intersects the Utah state line. Apparently, the birds observed here are feeding on vegetation and insects in the alfalfa fields in summer and fall. One bird was observed on the Van Loan ranch on 2 different occasions during summer 1998 in hay meadows. In 1995, radio-marked birds moved from Fish Park to the Van Loan ranch during the summer.

The sagebrush habitat in the vicinity of Lower Bieser Creek south of the junction of DS and 5.7 roads supported a grouse population until the early 1980s. At that time, local landowners observed approximately 10 grouse displaying on one lek site for an unknown number of years. No birds have been observed in this area since that time and it likely is no longer used by sage grouse. However, this area has potential and could support grouse in the future with the development of suitable habitat.

Evidence of sage grouse (cecal droppings) was located in the area north of Renegade Point during the summer of 1998 (V. Graham 1997, pers. observ.). Although a historic lek site is located in the area, no use has been observed at this lek in many years. However, sage grouse were observed and photographed in this area in 1997. There may still be birds using this area at an unknown lek or perhaps moving into this area for nesting and feeding during the summer. The recent Triangle Fire in Summer 1995 may have positively impacted sagebrush habitat in the Upper Spring Creek/Hog Back area by reducing piñon/juniper woodlands and opening up and thinning dense mountain shrub communities. Mountain big sagebrush appears to be recovering in portions of the area burned by the Triangle Fire.

Currently, the primary sage grouse use area is in the Piñon Mesa area west and northwest of the Grand Mesa National Forest boundary. The majority of the use occurs in the open rolling sagebrush habitat from 2-V Basin east to the National Forest Boundary. The grouse also use the small mesas and benches that lie between the creeks running generally northward including Nelson Creek, Sheep Creek, Tommy Dodson, and Payne Canyon and the Little Dolores River. Sage grouse are also found north and south of the MS road in the open sagebrush in Luster Basin, the headwaters of the North Fork of West Creek, and the Fish Creek area. There is some evidence from local ranchers that the Gunnison sage grouse exists in the Snyder Flats area north of Unaweep Canyon. No use is presently known to occur in Unaweep Canyon although it was probably used in recent times.

Elevation on Piñon Mesa ranges from about 7,500 to about 9,800 feet. Only 1 lek area is known to be active along the MS road at higher elevation. Another known active lek area (composed of 3 alternate sites) is west of the headwaters of the little Dolores River. The third known lek area on Piñon Mesa lies north of the MS road in the headwaters of Nelson Creek. All known, active leks are on private land within this area.

E. HABITAT REQUIREMENTS OF THE GUNNISON SAGE GROUSE IN THE PIÑON MESA AREA

Habitat needs for sage grouse in the Piñon Mesa area relate to over winter survival (Nov-Mar), escape cover adjacent to lek sites (Mar-May), nesting cover (Apr-Jun), early brood-rearing habitat (May-Jun), late brood-rearing habitat (Jul-Aug), and fall habitat (Aug-Oct). Of these habitats, winter, nesting, and early brood rearing are most important with suitable escape cover near leks of near equal importance.

Winter Habitat: Little is known regarding winter habitat use by sage grouse on Piñon Mesa and probable ranges can only be estimated (Figure 4). The birds most likely move from the top of Piñon Mesa to lower elevations where more sagebrush is exposed and available for food. This movement is likely dependent on winter severity and snow depths. Drier winters with less snow may allow the birds to winter at higher elevation, while harsh winters with deep snow may force the birds to move to lower elevations. It is thought that areas such as Payne Mesa and other small mesas in this same general area at about this same elevation serve as wintering sites. Most of the sagebrush at this elevation is mountain big sage, which is suitable winter forage. It is speculated that sage grouse may have wintered in Unaweep Canyon, Glade Park, Trail Canyon, Fish Park and other similar habitats at lower elevations. Perhaps Snyder Flats, due to its lower elevation, may be used by wintering grouse, since it likely has more exposed sagebrush available during these months. The small amount of suitable winter habitat may be a limiting factor for this sage grouse population. In winter 1995-96, radio-marked sage grouse were known to be on Payne Mesa.

Lek Habitat: There appears to be adequate habitat available for display on Piñon Mesa, but many suitable sites appear to be overgrowing with heavy stands of silver sage and snowberry. At least 6 formerly active leks are no longer occupied. Piñon-juniper invasion and loss of suitable nesting habitat that changed the structure of the sagebrush community is the probable cause for loss of these lek sites. Most sites presently used for display are those that are open and where salt is provided for cattle. These same sites were once used as domestic sheep bedding and salt grounds. Intensive use of the salting sites by cattle tends to keep the area open and free of mountain shrubs. Interestingly, the Pond Lek site on Payne Mesa is surrounded by tall juniper trees and oakbrush (greater than 15 ft). This vegetation is relatively thick and grouse have been observed displaying under the taller oakbrush which is adjacent to the opening created by the cattle salting site. There is little ground cover at this lek during the spring when males are displaying. The other occupied lek sites are more open and are dominated by big sage and silver sage surrounding the lek opening.

Nesting Habitat: Little is known regarding sage grouse nest site selection on Piñon Mesa. It is known that most nesting usually occurs within 2 miles of the lek site. All of the currently used lek sites have suitable nest cover in close proximity to the leks. For nesting, taller, more dense sagebrush (greater than 18 inches high and greater than 25% canopy cover) with scattered deciduous shrubs is very important for the birds. These sites are usually at higher elevations where increased moisture allows greater and more robust grass and forb cover (greater than 25 and 8% respectively, greater than 6-8 in. total herbaceous height). Nests are typically at the base of taller (greater than 18 inches) sagebrush plants. Research indicates that typically 80% of nest sites are within 2 miles of the lek.

Early Brood Habitat: The description of this habitat at hatch is identical to nesting with hens moving their young chicks (less than 5-10 days of age) into areas dominated by forbs and grasses with less than 20% live sagebrush canopy cover. Hens select open or disturbed sites in the sagebrush that have abundant forbs and higher moisture levels. Grasses and forbs dominate at all known use sites with a definite preference for live sagebrush escape cover (greater than 18 in. height). Good brood habitat is apparently found in and surrounding 2-V Basin and also immediately east of this area along both sides of the MS Road. In this area, local ranchers and CDOW personnel have made numerous observations of hens with broods. The vegetation is dominated by dense stands of silver sage and snowberry. It has high moisture levels and probably provides some moist

openings which support forbs and good insect populations. The insects are important for young grouse; they provide high protein necessary for rapidly growing chicks.

Late Brood Habitat: Hens with older broods prefer moist sites near stockponds, upper drainages, and on north slopes depending upon elevation and site. Forbs and grasses dominate at preferred use sites with some live sagebrush and other deciduous shrubs (snowberry, serviceberry, Gambel oak). Shrub cover is important for escape while most foraging is on forbs.

Fall Habitat: Sage grouse of all ages and gender continue to use habitats identical to those used by broods in July and August until plants become dried out (several successive killing frosts) or heavily grazed. Taller sagebrush (greater than 20 inches high) with more canopy cover (greater than 20%) becomes more important. Use increases of north and west facing slopes and diets change gradually from a high proportion of forbs to a high proportion of sagebrush. During extensive snow cover, in late fall and early winter, use of mountain big sagebrush stands is extensive.

V. CONSERVATION STRATEGY

A. PIÑON MESA AREA GOALS AND OBJECTIVES

To guide management efforts of the Partnership in securing the long term status of the Gunnison sage grouse and meeting the needs of the other resources, involved groups, and individuals, the following goals and objectives were developed.

Overall Goal: Increase sage grouse numbers and distribution in the Piñon Mesa area while maintaining current ranching uses and a healthy landscape.

Sage Grouse Population Goal: Maintain a sage grouse population size in the Piñon Mesa area that is in balance with the carrying capacity of the habitat, striving for a minimum spring population of at least 8 active leks (7 on Piñon Mesa, 1 on Glade Park) each with 15 males that are counted during spring lek counts. Thus, 120 males would be counted on 8 active leks ($8 \text{ leks} \times 15 \text{ males/lek} = 120$) which would represent a total male population of 160 ($120 \text{ males counted} \div 0.75 \text{ of those present} = 160$) and a hen population of 320 (2×160) for a total spring population of 480 birds. This would be an optimum number to achieve within the next 10 years. If a population of 300-500 grouse could be achieved in 10 years, it would represent a reasonable population goal. Presently, it is felt by many wildlife managers that a population of about 500 birds would be sufficient to maintain a population for at least 25 years. The minimum population goal is that level, 78 to 123 birds, measured in 1997-99 (3-year average).

Sage Grouse Habitat Goal: Maintain and improve, on suitable sites across the Piñon Mesa landscape, relatively large, contiguous stands of sagebrush with a variety of vegetative conditions interspersed throughout, in the desired arrangement with good connectivity to provide the quantity and quality of sage grouse habitat to support the desired optimum population level by 2010.

Populations are basically products of the environment, or habitat in which they are found. Thus, habitat quality is an indicator of how well habitat meets the needs of sage grouse. Also, the health of the natural system in which populations exist, and its ability to function in a dynamic manner through time largely determines its capability for long-term sustainability. Time, space, a focus on the natural processes and their ability to function, and the relationship with surrounding communities are of primary importance and concern in achieving the habitat goal of this plan.

B. GENERAL CONSERVATION OBJECTIVES

Using these goals as a target, the Piñon Mesa Partnership identified 3 dominant themes or categories; 1) habitat quality, 2) habitat loss/fragmentation, and 3) physical disturbance to the population, for which general conservation objectives were developed. Specific objectives were developed for habitat quality. These objectives were developed largely based on the issues and/or factors identified as in some way contributing to

the static or declining population size of sage grouse or affecting the quantity or quality of sage grouse habitat in the Piñon Mesa area.

The purpose of these objectives is to guide the selection of conservation actions. These objectives are also useful to explain the overall thrust of the conservation strategy. These objectives are:

Habitat Quality: Maintain and/or improve the quality of sage grouse habitat.

Description: Habitat quality is an indication of how well habitat meets the needs of sage grouse. Habitat in poor condition is of lower quality than habitat which is in good condition because higher quality habitat provides more of the essential components such as food, water, and cover. Generally, the group of factors that affect habitat quality and/or fragmentation (discussed in the following section) are considered to be the most important to sage grouse recovery.

Specific Objectives: (Habitat Vegetation)

Leks:

Habitat Function: Used for display and mating, require good acoustics and visibility for display activity, and for predator detection.

Location: Within at least 300 yards to $\frac{1}{4}$ mile of nesting habitat. Within 200 yards of escape cover (large expanses of sagebrush). Typically in broad valleys or benches, broad ridges or mesas. At least 200 yards from trees or other potential raptor perches.

Size: 1-5 acres.

Shape: Irregular, but usually circular or short and linear.

Time of use: Mid March to early June.

Composition: Perennial grass cover greater than 20%.
Total sage cover less than 10%.
Total forb cover greater than 10%.

Structure: No trees or deciduous shrubs greater than 3 feet tall.
Grass and forb height 5-10 inches.
Sage up to 15 inches.

Near Lek Areas:

Habitat Function: Provides escape cover for displaying males, visiting females, resting birds.

Location: Within 200 yards of lek.

Size: Greater than 1 acre up to 40-60 acres.

Shape: Irregular, if linear, then greater than 200 yards in width, if patches, then greater than 200 yards in diameter.

Composition: Perennial grass cover greater than 20%.
Total shrub cover (sage + mountain shrubs) 20-30%.
Total forb cover greater than 10%.

Structure: Sagebrush and other shrubs greater than 15 inches tall.
No potential raptor perches.

Nesting/Early Brood Rearing Areas:

Habitat Function: Provides good hiding and nesting cover and high levels of insects and succulent forbs to meet brood rearing nutritional requirements.

Location: Within 3 miles of a lek.

Size: Overall nesting area greater than 10 acres made up of 1/4-1 acre patches of sage ranging from dense to sparse.

Shape: Need high level of interspersed within heavier sagebrush areas.

Time of use: April through July.

Composition: Patchy: **Foraging areas:**
 Total sage cover less than 20%.
 Total forb cover greater than 15%.
 Total grass cover greater than 25%.
Hiding areas:
 Total sage cover greater than 25%.
 Total forb cover greater than 10%.
 Total grass cover greater than 20%.
Structure: Sagebrush greater than 18 inches tall.
 Abundant standing herbaceous material.
 Herbaceous average height greater than 8 inches.

Late Brood Rearing Areas:

Habitat Function: Provides moisture and high levels of succulent forbs and insects, as well as hiding cover. Typically edges of hay meadows, riparian areas, ponds, seeps, drainage bottoms.
Location: Near stands of live sagebrush or other deciduous shrubs close enough for escape. Less than 1 mile from early brood rearing areas, often north slopes.
Size: Greater than 100 yards, usually around 200 yards wide.
Shape: Irregular, frequently linear, high interspersions of stand and cover types.
Composition: Sagebrush less than 20%.
 Total shrub cover less than 25%.
 Perennial grass cover greater than 25%.
 Perennial forb cover greater than 15%.
Structure: Herbaceous vegetation greater than 10 inches tall.

Fall and Winter Habitat:

Habitat Function: Provides thermal and hiding cover, abundant supply of taller sagebrush (15-25 inches).
Location: Usually broad basins, ridges, and north to northwest facing slopes.
Size: Extensive stands of sage, usually in patches larger than 100-2200 acres.
Shape: Interspersions of shorter stands of sage (ridges) with taller stands (swales, valley bottoms).
Composition: Total sage cover greater than 20% (25-30% preferable).
 Total forb cover greater than 10%.
 Perennial grass cover greater than 15%.
Structure: Tall sage 15-25 inches.
 Shorter sage greater than 10 inches.

Habitat loss/fragmentation: Reduce fragmentation by preventing, minimizing, and mitigating past, present, and future loss of sage grouse habitat.

Description: Loss of sage grouse habitat refers to areas that once provided habitat, but no longer do because that habitat no longer exists or is not available. It should be thought of as a permanent loss in the area. Another example of habitat loss occurs when a subdivision occupies an area that once was a sagebrush community.

Fragmentation refers to the distribution or location of habitat in terms of its physical position or connectiveness.

Physical disturbance to the population: Identify and manage physical disturbances to reduce adverse effects to sage grouse.

Description: This refers to the physical disturbance to sage grouse, the birds themselves. Physical disturbance can result in sage grouse death or exert stress particularly if disturbance occurs during biologically critical periods or times.

C. ISSUES OR FACTORS THAT AFFECT SAGE GROUSE POPULATIONS AND THEIR HABITAT

The following issues and concerns were identified during the development of the Piñon Mesa Conservation Plan. All issues were treated equally and no limitations were placed on what could be proposed as a concern. Thus, a long and varied list of concerns and possible reasons for the Gunnison sage grouse decline was developed. The issues and concerns are listed in no particular order. The issues listed may not include all the issues discussed and some issues may not be resolved and are out of the scope of the plan.

Issues That Effect Sage Grouse Populations and Habitat

□Vegetative Habitat:

Habitat quality and quantity---The major factors that drive sage grouse populations are quality and extent of habitat. No other bird is so habitat specific to one particular plant type (sagebrush) in meeting its annual life requirements. Size of habitat is important because sage grouse move seasonally between suitable habitat types. Sage grouse are unable to adjust their life processes to fit a pattern of land use that eliminates or adversely disturbs large tracts of sagebrush.

Grasses and forbs---There is concern among ranchers regarding the quantity of residual grass that is recommended for optimum sage grouse habitat. Ranchers make every effort to manage their lands in a manner that meets their ranch livestock production objectives. This includes management of the vegetation for optimal production to support livestock and includes maintenance of healthy plant communities that also support wildlife. In some years, weather reduces forage production and at times livestock interests may negatively impact optimum sage grouse habitat. This is a reality of land management and wildlife managers should be aware of circumstances involving ranch management and its relationship to sage grouse management. Annual rotation of pastures for livestock grazing may offer potential in some areas such as Fish Park and on private lands. The rotation system would allow for ungrazed pastures for grouse production. Poor nest and brood survival has been attributed to the lack of herbaceous understory within the sagebrush community. Since grouse initiate nesting prior to spring herbaceous vegetation growth, it is constructive to try and maximize herbaceous residue from the previous year.

Condition of winter habitat---Winter habitat is critical to sage grouse because without sufficient areas of exposed sagebrush they cannot survive the winter to reproduce in spring. Although sage grouse are widely distributed in winter, suitable winter feeding sites do not constitute a large proportion of the available land area. Despite improvements made to other habitat types, sage grouse will not survive unless their wintering areas are protected from fragmentation or factors that destroy or degrade them. There may be potential for winter range development in lower areas examples include Fish Park, Spring Creek Hogback, the Little Dolores River, and BLM lands in the vicinity of the junction of 5.7 and DS roads.

Management of habitat improvement projects---It needs to be recognized that habitat improvement projects that benefit sage grouse may not be the same as those practices selected by private landowners for their livestock management programs. An example would be brush beating sagebrush. For sage grouse, brush beating 1/3 of the habitat in need of management may not be in the best interest for livestock management. Ranchers may be foregoing maximum livestock benefits for practices that benefit sage grouse. Other concerns of ranchers include the practice of leaving about 6"-8" of sagebrush stubble in brush beating projects for best sage grouse benefits, and limitations on use of fire as a range improvement technique, particularly in sagebrush and piñon-juniper habitat. Cooperatively funded projects with CDOW and BLM may offset and compensate landowners for their consideration of sage grouse land management practices.

Fire suppression---Wildfires are natural with effects that vary depending upon size of burned areas and the intensity and severity of the fire. For many decades, public land management agency policy was to

suppress all natural and man-made fires. Controlling and preventing fires may have resulted in degraded habitat conditions for sage grouse. There may be potential for the use of limited controlled burns to reduce piñon-juniper encroachment in selected locations. Presently, there are piñon-juniper ridge lines and low ridge points that extend into sagebrush habitats that lend themselves to burning without endangering larger sagebrush areas. Controlled burn options should be left open for vegetation management practices that will benefit both livestock management and sage grouse management. Soil conditions should be assessed to assure these sites are suitable for recovery of sagebrush, grass and forbs. Extreme care should be taken so that large (greater than 200 acres) fires do not burn uncontrolled in critical sage grouse habitat.

Funding for habitat improvement---CDOW, Bureau of Land Management (BLM), Natural Resource Conservation Service (NRCS), and USFWS through PFFW as well as other potential sources for habitat improvement projects should be used to the maximum potential to assist in maintenance and improvement of sage grouse habitats. CDOW, BLM, and NRCS should provide technical assistance and information when requested by landowners to aid in habitat projects implemented to benefit sage grouse.

Mountain shrub management--- Gunnison sage grouse appear to be somewhat tolerant of oakbrush, however, the biological relationship is not well understood. Large oakbrush stands often provide some areas of grass production when mixed with sagebrush communities. Some extremely heavy stands of oakbrush may be treated (thinned) when appropriate. It is recognized that oakbrush will resprout after burning or cutting.

☐ **Land Planning/Mitigation:**

Fragmentation---Habitat fragmentation occurs when areas of suitable habitat are fragmented and divided into smaller areas due to processes such as physical destruction or degradation. Any patch of habitat isolated by different habitats and/or unsuitable terrain may be considered fragmented. As habitat becomes increasingly fragmented, fewer individual birds exist. Sage grouse are especially sensitive to fragmentation because of their fidelity to lek, nest, winter, and brood-rearing sites. Even when their habitat is absent or degraded, they will continue to attempt to use these areas and will subsequently be exposed to higher mortality risks further reducing their population size.

Housing development---Housing development in the Glade Park area near the Glade Park store has severely fragmented sage grouse habitat. Currently, it is felt that as housing development occurs the chances of the area to be repopulated by sage grouse decreases. Small parcels are being fenced, new roads are being developed and power lines are being built to supply homes with electricity.

In the past, there were more homesteads with cabins than there are today on Piñon Mesa where sage grouse are currently found. Limited cabin development on Piñon Mesa may not impact sage grouse populations. Cabins are often placed in areas surrounded by either aspen or conifers for aesthetic reasons and in these instances impacts to sage grouse may be minimal.

☐ **Utilities:**

Powerlines---The effects of power lines on sage grouse are severe. Powerlines have been documented to serve as predator perches in Utah and Colorado with subsequent loss of all leks visible to raptors (primarily golden eagles) from perches on power line poles. Further, counts of sage grouse pellets near power lines decrease as distance to power lines decrease up to one-half mile. Thus, a strip about one-half mile on each side of power lines is generally avoided by sage grouse. These observations are supported by measurement of distances to power lines of radio-marked sage grouse throughout sage grouse habitats in Colorado. Clearly, sage grouse avoid power lines when possible. Power lines have increased dramatically in the Glade Park area (immediately north and south of store) where sage grouse appear to have been extirpated. Housing development is the primary reason for the increase. No large-scale power lines are currently envisioned for the primary sage grouse habitat on Piñon Mesa.

Pipelines---No major pipeline development is currently being considered on Piñon Mesa. Pipeline development (construction) can be negative if not properly managed to avoid adverse effects to breeding (March-mid May), nesting (mid April-early July), and early brood rearing (mid May-mid July). However, reseeding of areas disturbed by pipelines with desirable forbs and taller grasses can be beneficial to sage grouse especially if the width of the area disturbed is minimal (less than 100 yards) and roads/trails used during construction are closed and reseeded after completion of the pipeline construction interval.

Roads---Currently, and in the foreseeable future, roads do not appear to be a major concern with sage grouse population on Piñon Mesa. However, if sage grouse populations can be reestablished in the vicinity of DS road, high speed traffic may impact grouse. All other roads in occupied habitat are not suitable for high speed traffic and roadkill potential is considered to be low. Roads can be classified as primary, secondary, and as trails. Primary roads are those that are classified as state and federal highways. These roads are generally high speed and are paved. Secondary roads generally have county designations although some BLM and USFS roads can fit in this category. Some of these roads may be paved but most are generally gravel or dirt. These roads have moderate to low speed ratings. Trails generally are unsurfaced, lack formal designation, and have low speed ratings. Sage grouse prefer to walk to reach useable habitats throughout the year except when snow cover increases their conspicuousness. Sage grouse that walk across primary and secondary roads are at great risk of death from moving vehicles. The end result of all primary roads and many secondary roads is reduction in the size of the sage grouse population as those birds adjacent to the road are killed by road traffic. Because young sage grouse learn from older sage grouse, populations that traditionally used areas prior to road establishment or improvement become smaller over time as the older (and young) birds become fewer in number due to road disturbance (and death). Thus, traditional movements are often eliminated. Trails have less impact, depending upon vehicle speed.

Fence designs---Fences are necessary for livestock management. However, wood fence posts can provide perches for predators of sage grouse. Also, sage grouse have been observed flying into fence wires, especially near preferred use areas such as leks. Fence management that reduces potential perch sites (metal posts) and allows larger spacing between wires (2 or 3 vs. 4 or 5) could be less negative for sage grouse.

□ **Loss of Topsoil & Productivity:** Soil erosion is not a major problem on Piñon Mesa. Erosion loss could occur after wildfires and rapid reestablishment of ground cover should be a primary consideration after fire. Some slumping does occur in this area, but is not widespread. Sandy soil exists in lower elevation sage grouse habitat such as Fish Park. Soil is the primary factor determining the potential for vegetation production of a given site. With reduction of the herbaceous understory cover in sagebrush ecosystems, soils have become more vulnerable to wind and water erosion.

□ **Timing, Intensity, and Duration of Livestock/Big Game Grazing:** Potentially, timing and intensity of livestock/big game grazing may affect sage grouse nesting and brood rearing success. The peak of sage grouse hatch is the last week in May and the first week in June, depending on weather conditions. On many of the ranches on Piñon Mesa, livestock production is the primary use of the land. Ranchers are aware that livestock/big game grazing can directly compete with sage grouse for food (forbs and insects) and nesting cover during this time. Likewise it is recognized that fall grazing can remove residual cover needed the following spring for nest and brood cover. On Piñon Mesa, where sage grouse are found, vegetation is usually not mature enough for livestock grazing until mid-June, which is good for sage grouse nesting and early brood rearing. The distribution and potential over browsing by deer and elk on big game winter ranges may have had effects on important forage shrubs and associated plant communities which may have influenced sage grouse habitat quality. Habitat management programs, which involve increases of forb and grass cover while maintaining live sagebrush will benefit livestock, sage grouse, deer and elk, as well as other wildlife species.

- **Drought:** Sage grouse production is indirectly affected by drought. While sage grouse are not limited by water in most cases, they are limited by the vegetative growth and insects lost during drought conditions. In the Piñon Mesa area, both nesting success of females and brood survival decline severely during years with low soil moisture. This effect is probably increased if land management practices remain unchanged during years with low soil moisture. However, drought does not appear to impact lek attendance of males.
- **Predators (coyote, ground squirrel, badger, eagle, hawk, falcon, bobcat, skunk, raccoon):** Losses of sage grouse nests and young to predation are often high and can, in some locations, be the most significant factor in determining annual recruitment to the population. Studies have shown that ground squirrels and badgers can destroy up to 50% of the current year's nest and egg production. There is also a concern over coyote populations, which appear to be increasing, and the effects they may have on sage grouse. Eagles and hawks can be effective predators on sage grouse and some feel that eagle predation is increasing. The quality and quantity of grasses and forbs and other vegetation cover influence rates of predation. Predation is reduced when there is sufficient vegetation to conceal nests. Removal of piñon and juniper trees and tall shrubs can be effective in reducing predation risk of sage grouse.
- **Scientific Lek Harassment (i.e., Physical Disturbance Resulting From Scientific Studies):** Research on sage grouse sometimes requires capture and marking (bands, radios) of individual grouse. Capture of grouse is usually most easily accomplished when birds are concentrated on or near leks for the purpose of display and mating. Methods used range from spotlighting to locate grouse that are then captured using long-handled nets to walk-in traps placed on or near leks. Repeated disturbance of sage grouse on leks has been demonstrated to make individuals more wary and flush more readily. Yearling males may change leks following marking but the available data suggest that this age/gender class commonly investigates a series of leks in their first year of life. Studies of radio-marked male and female sage grouse demonstrate strong attachment to the lek of capture despite repeated trapping activities.
- **Conflicting Uses During Critical Biological Activity Periods:** The critical biological activity periods for sage grouse are during winter, breeding, nesting, and early brood rearing (December-mid July). Conflicting uses during this period are those that physically prevent sage grouse from using preferred habitats. These uses range from human disturbance (including pets), motorized vehicles, to herding of livestock and heavy grazing/browsing by deer and elk and by domestic livestock.
- **Recognition of Private Landowners Rights:** Most landowners are willing to work collectively toward a goal, as long as the recommendations or actions concerning sage grouse do not impact their efforts to make a living. However, most private landowners are environmentally concerned and appreciate wildlife and try not to negatively affect habitat useful to wildlife. These landowners do good things for the land without having to be forced into action by an endangered species. Landowners are concerned about the protection of their rights to manage their lands as they view appropriate with no interference by the State or Federal government. This particular issue focuses on the potential for Federal intervention on private property management, use, and development should the Gunnison sage grouse become listed as a threatened or endangered species. The issue does not actually emerge until listing occurs. The Endangered Species Act, however, does provide for protection should the bird become listed. The ramifications can become complex and are discussed in Appendix D. Generally, landowners would likely see no impacts to land management practices which are currently in use.
- **Monitoring/Research:** Monitoring of sage grouse populations through use of counts of males on leks has been used to estimate trends in population size. This effort requires vehicle access via roads and trails during the late March-mid May interval. Properly conducted, spring counts are not known to affect sage grouse. Research on sage grouse is periodically needed to learn more about specific requirements and responses to habitat treatments. The need for monitoring and periodic research will continue. Monitoring of vegetation in relation to grazing by domestic livestock and big game, especially in response to vegetation treatments, will continue on public lands. Annual lek counts are conducted by CDOW including counts of males and females at leks. Efforts are taken to gather census information with as little impact to leks as possible. Techniques

usually include the use of binoculars and spotting scopes. Usually, a minimum of three to four counts are conducted at each lek during the spring, and these are spread out over about five weeks.

- **Poisonous Plants:** There was some concern that poisonous plants may be eaten by sage grouse resulting in death. There are no known problems with grouse being poisoned by eating of native plants.
- **Recreational Uses:** Sage grouse have been hunted and their mating rituals observed since prior to European settlement based on native American artifacts and ceremonies. Sage grouse are not presently hunted on Piñon Mesa and there is no organized watchable wildlife viewing for the species within the boundary of the area. Other recreational use of the area such as big game hunting, blue grouse hunting, and predator hunting are not thought to be negative, although accidental kills of sage grouse may occur. Efforts should be made by CDOW to educate and inform hunters of the potential for misidentification of grouse species. These efforts should include development of pamphlets to distribute to hunters and signs at important locations providing information about sage grouse. Use of all terrain vehicles has the potential to negatively impact sage grouse, especially in winter. However, much of the area is seasonally closed due to snow cover, which limits access.
- **Hunting:** Sage grouse hunting in the Piñon Mesa area has been closed since 1989 when it was recognized that the population appeared to be declining. Prior to that time seasons were generally open for sage grouse hunting. From 1970 to 1988 seasons were open in all years except 1973 and 1974. Generally, the CDOW recommends no hunting until populations reach a standard of 100 cocks counted in the spring for 3 consecutive years. Hunting of sage grouse in this area is not contemplated for the foreseeable future. No information on the number of grouse harvested annually is available for this population for any year.

VI. CONSERVATION ACTIONS AND IMPLEMENTATION

The foundation of the Piñon Mesa sage grouse Conservation Plan is its goals and objectives which together establish a framework for developing conservation actions. Conservation Actions are designed to be consistent with the plan's goals and also to meet one or more of the objectives. These actions also address issues that affect sage grouse, and/or their habitat. Due to the interrelationship of the habitat components, resource values, and issues, many actions may apply to more than one objective. However, to avoid duplication, these actions have been listed in Table 1 where the link is most direct. Any additional actions identified at a later date will be analyzed by the Partnership for the application and design to ensure the appropriateness and compliance with the goals and objectives set forth in this plan.

Plan implementation will be priority-based starting with those actions the Partnership believes to be most effective at accomplishing their goals. This group recognizes the need to be opportunistic in carrying out specific conservation actions as situations present themselves. For example, a particular conservation action might be implemented sooner than scheduled, if funding became available, or a group or individual came forward to help with completing a task.

Some actions have already begun, or are ongoing. Other actions would need to be done continually throughout the plan. These are normally a matter of policy or require small changes in the way resources are managed and land use activities take place. Sometimes a land use has to be proposed or initiated by a third party before the conservation action can be applied.

The adoption of these Conservation Actions will be the responsibility of the Partnership. Specific steps or tasks needed to carry out a conservation action will be developed as the implementation proceeds. Cost estimates, including those for monitoring and evaluation will be identified. Every effort to leverage money and resources will be made. Many actions, such as vegetation treatments are costly, and will be dependent upon seeking cooperative funding from many partners, and possibly outside sources, such as grants.

Because plan accomplishment will require a lengthy period to complete, it is important to track progress at meeting our goals. At least yearly, the Piñon Mesa Partnership will convene a meeting to examine

accomplishments and keep the plan on track. As actions are completed they will become part of the yearly progress report. A consolidated report will then be prepared and disseminated to Partnership members prior to the yearly or spring planning meeting.

An important part of the yearly progress report and meeting will be to discuss and document any exceptions or deviations to planned accomplishments. Inadequate funding may preclude the completion of an action in a given period. In this instance, an adjustment to the implementation sequence would be needed. What is important is to show continual progress at accomplishing the goals in the plan.

VII. MONITORING AND EVALUATION

Monitoring data will be gathered and used to evaluate progress in meeting the goal and objectives of this plan. Monitoring will be coordinated to insure that data collected will provide the needed information to assess the on-the-ground management actions and to measure progress in resolving resource problems and conflicts. This coordination will include appropriate consultation and cooperation with rangeland users, general public, landowners, academia, private organizations and local, State, and Federal agencies. Direct involvement by interested parties in the collection of data and in the subsequent evaluations based on these data will add to the credibility of monitoring results.

It is important that all monitoring information be easily accessed by those interested. Monitoring the response of the Gunnison sage grouse population to conservation actions will be measured by total number of active leks, and the total number of males counted. The number of active leks and total males will reflect winter survival as well as chick production in the previous year. Changes in habitat quality which result from the implementation of planned actions will be monitored using techniques applicable to the specific project or action. Three year averages of lek counts will be used to assess sage grouse population trend (1995-97, 1996-98, 1997-99, etc.).

Evaluations may be conducted anytime during the implementation of this plan. The goal of evaluation is to determine whether progress is occurring, and if progress is not occurring, to identify adjustments. It is the intent of the Partnership to frequently communicate with other Gunnison Sage Grouse Work Groups to seek and exchange information as progress is made on implementing the Conservation Actions.

Table 1. Piñon Mesa Gunnison sage grouse Conservation Actions (listed in no particular order & with examples of how to accomplish), and Implementation Schedule (when & who).

CONSERVATION ACTIONS		IMPLEMENTATION SCHEDULE	
Action	Examples of How to Accomplish	When	Who
A. Information & Education			
1. Provide to the public, landowners, and others information that describes sage grouse habitat needs and , and identifies sage grouse population levels. Concerns and opportunities to improve conditions for sage grouse in this area.	<ul style="list-style-type: none"> a. Maps, newspaper articles, radio & TV spots, displays. b. Public contacts (e.g., individuals, County Commissioners, local schools, Land Conservancy), meetings, & make available copies of Conservation Plan. c. Videos (sage grouse & habitat, treatments, etc.) in Coop with other sage grouse groups. d. Brochures (e.g., Living with sage grouse in your backyard - control of sage grouse including brochure with difference between blue and sage grouse, including photos). e. Coordination/communications with; the public, other sage grouse groups, Montezuma Valley Audubon. f. Information sign at Glade Park store. 	<ul style="list-style-type: none"> a. Ongoing opportunistically. b. Ongoing opportunistically. c. 1999-00 (completed by other) d. Completed e. Ongoing opportunistically. f. 2000-2001 	<ul style="list-style-type: none"> a. The Partnership. b. The Partnership. c. DOW Lead, BLM, NRCS, d. Glade Park Ag. and Open Space e. The Partnership. f. DOW.
2. Work with interested parties, landowners and create a better understanding of sage grouse needs, the value and importance of sage grouse and sage habitat, and provide a basis for sharing of ideas and agreement on ways to improve sage grouse habitat and populations.	<ul style="list-style-type: none"> a. Meetings with interested landowners, government/regulatory entities (e.g., and livestock Associations). b. Maintain a current mailing list of interested citizens, and State, local, and agencies. c. Distribute information about importance of sage grouse; availability of programs, Best Management Practices, effects of certain land uses on grouse. d. Coordinated Management of sage grouse with other wildlife species and agencies. e. Continue to work with other groups. f. Communicate with other sage grouse partnerships. g. Provide monitoring information and training to landowners. h. Present programs at local schools. 	<ul style="list-style-type: none"> a. Ongoing opportunistically. b. Ongoing. c. Ongoing opportunistically d. Ongoing opportunistically e. Ongoing opportunistically f. Ongoing, annually. g. Ongoing opportunistically. h. Ongoing opportunistically. 	<ul style="list-style-type: none"> a. The Partnership. b. The Partnership. c. The Partnership. d. DOW, BLM, NRCS, FWS, e. The Partnership. f. The Partnership. g. The Partnership. h. The Partnership.
B. Monitoring			

CONSERVATION ACTIONS		IMPLEMENTATION SCHEDULE	
Action	Examples of How to Accomplish	When	Who
1. Identify and evaluate sage grouse habitat, factors and activities that have the potential to impact sage grouse or their habitat. Identify and evaluate critical sage grouse habitats.	<ul style="list-style-type: none"> a. Habitat mapping. Mapping may include but not be limited to overall sage grouse habitat, winter area, severe winter range, brood area, nesting area, active lek. b. Assess and track land-use changes, e.g., developments, roads, etc. c. On-site visits with landowners, holistic resource mgt. groups, livestock ranchers to discuss and assess habitat conditions and monitoring needs. d. Joint-interagency/landowner evaluation, information sharing. e. Provide monitoring training to landowners. Provide monitoring forms to landowners for lek counts and brood counts. f. Big game impacts to range conditions. 	<ul style="list-style-type: none"> a. Ongoing, annually. b. Update 3-5 years. c. As needed/requested/annually. d. As needed/requested/annually. e. As needed/requested/annually. f. Ongoing, annually. 	<ul style="list-style-type: none"> a. BLM, DOW, NRCS, landowners, b. BLM, DOW, NRCS, FWS, c. The Partnership. d. The Partnership. e. BLM, DOW, NRCS, Extension. f. DOW, BLM, private ranches.
2. Continue to gather or initiate the collection of baseline data to better understand and document factors for sage grouse, including response to applied conservation measures.	<ul style="list-style-type: none"> a. Sage grouse population monitoring/census, e.g. lek counts and brood counts, research including radiotelemetry studies i.e., movements, habitat use. b. Design and carry out monitoring for applied measures, e.g., treatments. c. Continue to identify changes in the sage grouse populations size (use 3 yr. lek counts). 	<ul style="list-style-type: none"> a. Annually, March-May/July-August. b. Annually, as needed. c. Annually. 	<ul style="list-style-type: none"> a. DOW, BLM, landowners b. BLM, NRCS, Extension, c. DOW.
C. Avoiding or mitigating permanent loss of habitat			
1. Develop and encourage incentives for landowners to avoid or mitigate loss of sage grouse habitat.	<ul style="list-style-type: none"> a. Land exchanges. b. Conservation Easements Mesa County Land Conservancy, CDOW, CCA, or Elk Foundation, etc. c. Transferrable development rights. d. Payment for non use of sage grouse habitat, if funds are available for long-term conservation. e. Application of specific land use practices that benefit grouse, e.g., water conservation, grazing plans. f. Develop recommendations for managing sagebrush community as a whole, including all uses. 	<ul style="list-style-type: none"> a. Ongoing opportunistically. b. Ongoing opportunistically. c. Ongoing opportunistically. d. Ongoing opportunistically. e. Ongoing opportunistically. f. Ongoing opportunistically. 	<ul style="list-style-type: none"> a. BLM/Private landowners. b. Private landowners. c. The Partnership, County, ranchers, developers. d. DOW, NRCS (WHIP, EQIP), e. DOW, BLM, NRCS, Pvt., f. DOW, BLM, NRCS, Pvt., FWS,
2. Enhance existing and restore former sage grouse habitat to offset loss of habitat elsewhere.	<ul style="list-style-type: none"> a. Vegetation treatments, e.g., brush beat, burn, reclaim. seed, Piñon-Juniper controlled fire (use extreme care). b. Mitigating effects of human population growth and development. 	<ul style="list-style-type: none"> a. Ongoing opportunistically. b. Ongoing opportunistically. 	<ul style="list-style-type: none"> a. BLM, DOW, NRCS, Extension, b. The Partnership, County

CONSERVATION ACTIONS		IMPLEMENTATION SCHEDULE	
Action	Examples of How to Accomplish	When	Who
3. Prevent loss and fragmentation of habitat from on of roads and utilities.	a. Relocate or modify new utility lines, roads, developments, etc. in key habitat.	a. Ongoing opportunistically.	a. BLM, DOW, FWS, County, etc.
D. Restoring or improving quality of grouse habitat and populations			
1. Enhance existing riparian areas, or create or small wet areas to benefit sage grouse nesting and roosting habitat.	a. Design and implement livestock grazing management practices to benefit sage grouse. Use fencing for rest rotation management in nesting and brood rearing areas. b. Modify or adapt springs to create small wet areas. c. Enhance and protect existing natural wet areas.	a. Ongoing opportunistically. b. Ongoing opportunistically. c. Ongoing opportunistically.	a. BLM on Public lands, NRCS landowners on private lands. b. BLM on Public lands, NRCS landowners on private lands. c. BLM, FWS, landowners.
2. Eliminate or modify situations that cause disturbance to sage grouse areas.	a. Modify power lines and wood fence posts (to remove raptor perches) in sage grouse areas. b. Cut pinyon-juniper trees near leks and elsewhere within potential sage grouse habitat to remove raptor perches, and to maintain the sagebrush habitat. c. Sale of Christmas trees in key sage grouse areas.	a. Ongoing opportunistically. b. 1999 and ongoing. c. Opportunistically.	a. DOW, BLM, Power Company, FWS. b. BLM (contracts, Delta Honor landowners, NRCS, & DOW, & FWS contracts to landowners). c. BLM (if approved), landowners.
3. Implement local guidelines and use Best Management Practices to guide land uses to increase sage grouse populations and improve sage grouse habitat quantity and quality.	a. Implement livestock grazing practices that benefit sage grouse habitat quality and reduce physical disturbance to grouse during critical times, i.e., breeding and nesting. b. Restore and rehabilitate riparian areas. c. Proper land treatment design and construction that reduce impacts to sage grouse (e.g., how and where to plan projects). d. Land development options. e. Construction standards (placement, timing, rehab. techniques).	a. Ongoing opportunistically. b. Ongoing opportunistically. c. Ongoing opportunistically. d. Ongoing opportunistically. e. Ongoing opportunistically.	a. BLM-permittee's, landowners. b. BLM, FWS, landowners. c. The Partnership. d. The Partnership. e. The Partnership.
4. Improve sage grouse habitat quality, and increase vegetation cover, especially forbs and grasses in sage grouse habitats and in historic, unoccupied areas where vegetation treatments would improve conditions and increase the ability of supporting reoccupation by sage grouse.	a. Develop and use sound grazing management practices in coordination with grazing management plans, BLM allotments. b. Plant and/or re-seed with a high proportion of forbs. c. Design vegetation treatments in sage grouse areas to be compatible with sage grouse needs. d. Improve ground cover in sage grouse areas. e. Manage big game population and habitat to minimize or avoid conflicts on sage grouse habitats, and to encourage moving them off grouse habitat, i.e., to the extent	a. Ongoing opportunistically. b. Ongoing opportunistically. c. Ongoing opportunistically. d. Ongoing opportunistically. e. Ongoing opportunistically.	a. BLM, Private. b. BLM, NRCS, DOW, FWS, c. BLM, RMEF, NRCS, DOW, FWS, etc. d. BLM, RMEF, NRCS, DOW, FWS, etc. e. BLM, DOW, Private.

CONSERVATION ACTIONS		IMPLEMENTATION SCHEDULE	
Action	Examples of How to Accomplish	When	Who
	<p>Develop the highest quality big game habitat outside the sage grouse prime</p> <p>f. Integrate weed management with grouse needs.</p> <p>g. Vegetation treatments to improve vegetative age class diversity, improve seed and forb component (may or may not need to seed), and reclaim any disturbed</p> <p>h. Develop habitat enhancement plans for individual ranches.</p> <p>I. CDOW and BLM will develop a strategic plan for management of sage habitat on BLM lands.</p> <p>j. Through detailed maps, identify essential wildlife habitat including overall foristic habitat, winter area, severe winter range, brood area, nesting area, active and inactive lek. Mapping should delineate areas of primary concern for management, and enhancement of leks, nesting areas, wintering area, brood area, etc.</p>	<p>f. Ongoing opportunistically.</p> <p>g. Ongoing opportunistically.</p> <p>h. Ongoing opportunistically.</p> <p>I. Ongoing and revised as necessary.</p> <p>j. Ongoing annually.</p>	<p>f. BLM, County Weed Board,</p> <p>g. BLM, Private, CDOW.</p> <p>h. Individual ranches, CDOW,</p> <p>I. BLM and CDOW</p> <p>j. CDOW, BLM, individual</p>
5. Increase opportunities for improving over-winter survival, escape cover near leks, nesting cover, and the range or use areas of sage grouse, e.g. use of new and old areas.	<p>a. Improve quality of sagebrush dominated habitats by using grazing management and vegetation treatment, e.g., mechanical treatment, fertilization.</p> <p>b. Avoid treatment projects that remove large stands of sagebrush in critical</p> <p>c. Attempt to expand existing sage grouse use areas/range by using calls to attract leks during the breeding season to use new lek sites close to or adjacent to existing</p>	<p>a. Ongoing opportunistically.</p> <p>b. Ongoing opportunistically.</p> <p>c. 2001 (start).</p>	<p>a. BLM, DOW, NRCS, FWS,</p> <p>b. BLM, FWS, Private.</p> <p>c. DOW.</p>
E. Reducing Physical Disturbance to Sage Grouse			
1. Mitigate or reduce conflicts with sage grouse during critical biological periods and on critical habitats.	<p>a. Noise or physical disturbance ordinances or restrictions during critical periods for leks, e.g. manage on-road travel and OHV use in key grouse areas to avoid conflicts during critical times.</p> <p>b. Delay or modify construction start up dates or hours during peak lek use dates in April and May and after 9:00 am.</p> <p>c. Control or limit pets.</p> <p>d. Coordinate grazing management to avoid conflicts on leks during April, May, and early June.</p>	<p>a. Ongoing opportunistically.</p> <p>b. Ongoing opportunistically.</p> <p>c. Ongoing opportunistically.</p> <p>d. Ongoing opportunistically.</p>	<p>a. BLM, County.</p> <p>b. BLM, FWS, County, DOW.</p> <p>c. DOW, FWS, County.</p> <p>d. BLM, FWS, Private.</p>
F. Improving landowner and community support and participation			
1. Incorporate economic, social and cultural values into conservation practices.	<p>a. Seek understanding, information sharing and maintaining communication.</p> <p>b. Adopt principle of voluntary participation.</p> <p>c. Involve landowners and, when appropriate, local communities in all</p>	<p>a. Ongoing opportunistically.</p> <p>b. Ongoing opportunistically.</p> <p>c. 1999, ongoing opportunistically.</p>	<p>a. The Partnership.</p> <p>b. The Partnership.</p> <p>c. The Partnership.</p>

CONSERVATION ACTIONS		IMPLEMENTATION SCHEDULE	
Action	Examples of How to Accomplish	When	Who
	sage grouse conservation. d. Protect and respect landowner property rights	d. Ongoing	d. CDOW, BLM, NRCS, FWS
2. Maintain local control.	a. Maintain Sage Grouse Partnership (must include landowners, local to serve as advisory body. b. Continually seek input and involvement. c. Annual (or as needed) hold a Partnership meeting to discuss progress and ds, and plan a yearly schedule of events and conservation action implementation.	a. Ongoing opportunistically. b. Ongoing opportunistically. c. Ongoing opportunistically.	a. The Partnership. b. The Partnership. c. The Partnership.
3. Develop, improve, and encourage credibility ss.	a. Seek outside scientific review of projects. b. Involve college and/or universities. c. Adapt and change as we go. d. Annually the Partnership will prepare and disseminate to the members and ogress report.	a. Ongoing opportunistically. b. Ongoing opportunistically. c. Ongoing opportunistically. d. Annually.	a. The Partnership. b. The Partnership. c. The Partnership. d. The Partnership.

APPENDIX A

GLOSSARY

Canopy Cover - The percentage of ground covered by a vertical projection of the outermost perimeter of the natural spread of foliage of plants. Small openings within the canopy are included.

Cecal dropping- A dark, tar-like excrement that is often observed on leks where sage grouse concentrate in the spring.

Extirpated - A term used for a species when it is considered to no longer be found in a specific area it once occupied. Extinct would be used when the species completely eliminated from all habitats and can no longer be found anywhere.

Fragmentation - Fragmentation is a term used to describe habitats or populations that have been broken up, separated, or divided due to many factors either natural or often man-made. Often this results in several or many small wildlife populations or habitats that may or may not be able to support a species over a long period of time.

Lek - An arena where male sage grouse display for the purpose of gaining breeding territories and attracting females. These arenas are usually open areas with short vegetation within sagebrush habitats, usually on broad ridges, benches, or valley floors where visibility and hearing acuity are excellent.

Lek Area - The geographic area that includes all closely allied lek sites within 1 mile. This geographic area is usually stable overtime.

Lek Count -The high count of males from all lek sites on the same day; which are taken at 7-10 day intervals between late March and mid May.

Lek Site - A particular site where sage grouse gather for display and mating in spring (Mar-May). The actual site used can vary daily, seasonally, and yearly.

Sagebrush - As referred to in this plan, includes the following species: **Basin Big** - *Artemisia tridentata tridentata*; **Mountain Big** - *Artemisia tridentata vaseyana*; **Black** - *Artemisia nova*; and **Silver** - *Artemisia cana*.

Steppe - A semi-arid grass-covered plain, usually lightly wooded.

Strutting Ground - See Lek.

APPENDIX B

LISTING FACTORS

Listing factors considered by the U.S. Fish and Wildlife Service in evaluating possible action under the Endangered Species Act.

Factor A. Present or threatened destruction, modification, or curtailment of its habitat or range.

The range of the Gunnison sage grouse in the Piñon Mesa Area has been greatly reduced in size and quality through habitat loss caused by plowing, spraying, road construction, and power lines; habitat fragmentation caused by the same factors, and habitat degradation caused by the same factors as well as inappropriate livestock management. Total range reduction is estimated at greater than 50%.

This Conservation Plan will reduce destruction, modification, or curtailment of the Gunnison sage grouse's range through implementing the following management actions: Eliminating major land disturbances from housing development and industrial uses (other than farming and ranching); by reducing unnecessary roads; reducing or eliminating disturbed land by livestock operations; using mechanical means for habitat improvement; reducing unnecessary utility lines/ and improving vegetative habitat and soil conditions by reseedling with forbs, by using proper grazing and hay mowing management, by managing noxious weeds, by appropriate big game management, and by appropriate herbicide use.

Factor B. Overutilization for commercial, recreational, scientific, or educational purposes.

No overuse of Gunnison sage grouse in the Piñon Mesa Area is apparent as hunting is not permitted, there is no commercial or recreational use, and scientific study (banding, radio marking) only affected 10-15 birds in 1995-96. Educational field trips may occur but are not likely to cause disturbance to the Gunnison sage grouse if proper viewing protocols are followed.

Factor C. Disease or predation.

No disease/parasite problems have been identified in Gunnison sage grouse in the Piñon Mesa Area. Predation is a natural event and about 50% of the total population disappears (dies) each year. Major identified predators of adults include golden eagles, goshawks, bobcats, and coyotes. Most loss of potential productivity is through nest failure caused by ground predators such as ground squirrels, badgers, etc.

Factor D. Authorities and existing regulatory mechanisms.

Members of the Piñon Mesa Gunnison Sage Grouse Partnership are committed to improving conditions for sage grouse in the area. While landowner adoption of the proposed conservation actions is voluntary, the Conservation Plan was developed with the spirit of cooperation and there is broad support for the goals and objectives contained in the Conservation Plan. The Partnership believes existing regulatory mechanisms are adequate to achieve these goals and objectives.

The Colorado Division of Wildlife, a branch of the Colorado Department of Natural Resources, has responsibility for the management and conservation of wildlife resources as defined and directed by state laws. The Division also has enforcement authority for poaching and harassment.

The Board of County Commissioners of Mesa County, Colorado has authority to regulate land use, land planning, and protection of the environment in the County. Mesa County has regulations to exercise such authorities including the review, approval or denial of proposed activities and uses of land.

The USDA Forest Service (USFS) has direction and authority for the maintenance of biological diversity on National Forests and for the protection and management of wildlife species and habitats as defined and directed by various Federal Laws and Regulations.

The USDA Natural Resources Conservation Service (NRCS) also has authority for conservation of the Gunnison sage grouse through various Federal Laws.

The USDI Bureau of Land Management (BLM) has authority for conservation of the Gunnison sage grouse and the management of natural resources and land uses on Public Lands through a number of Federal Laws and Regulations.

The USDI Fish and Wildlife Service (USFWS) has authority for conservation of the Gunnison sage grouse through the Endangered Species Act of 1973 and other Federal Laws.

Two other authorities for agencies working on Gunnison sage grouse conservation include a Memorandum of Understanding and a Memorandum of Agreement. In 1994, several federal agencies, including those listed here, signed a Memorandum of Understanding to establish a general framework for better cooperation and participation among these agencies in the management and conservation of species at risk, which are tending towards federal listing as threatened or endangered. In 1995, the state of Colorado and the U.S. Department of Interior entered into a Memorandum of Agreement which committed agencies in the Department of Interior and the state to collaborate and cooperate in management and conservation of declining populations of fish and wildlife and their habitat. This agreement has 2 important tasks: "The state and the Department agree to develop and implement programs to determine and monitor the status of species at risk;" and "The state and the Department will encourage partners and stake holders to take a leadership role in working with the state and the Department to develop and implement conservation actions through Conservation Agreements and Recovery Agreements. " A list of species for which the Department and the state would initially focus conservation actions on was written. This list specifically mentioned declining populations of sage grouse.

Factor E. Other natural or manmade factors affecting its continued existence.

Natural factors affecting the continued existence of Gunnison sage grouse in the Piñon Mesa Area include natural fragmentation and severe weather conditions during the nesting and early brood periods. Fire suppression is a man-made threat leading to changes in habitat through invasion of piñon-juniper and allowing sagebrush habitat types to become dominant, old-aged stands. Other man-made factors that effect sage grouse include continuous noise that impairs the acoustical components of males on leks; disturbance from construction or other projects; harassment from pets; and disturbance, death, or habitat degradation from use of off-highway-vehicles (OHV's)

To address these threats, fire or other habitat management may be prescribed to remove invasive trees and restore native plants and vitality to the sagebrush habitats used by sage grouse. Additionally, noise ordinances or restrictions during critical periods near leks may be enforced, construction start up dates may be delayed or modified, pets may be encouraged to be controlled or limited, and OHV use areas and other travel management in key sage grouse areas may be enforced.

APPENDIX C

LIST OF WORKING PARTICIPANTS

Aubert, Dahl	Rancher/Landowner
Braun, Clait	CDOW
Chesnick, Belle	Rancher
Creeden, Paul	CDOW
Crompton, Brad	Utah Division of Wildlife
Dollerschell, Jim	BLM
Gleason, Roy and Barbara	Rancher/Landowner
Gore, Warren	Rancher/Landowner
Graham, Van	CDOW
Ireland, Terry	USFWS
King, Doug	Rancher/Landowner
Lambeth, Ron	BLM
Meinhart, Don and Florine	Rancher/Landowner
Power, Rod	Rancher/Landowner
Tipping, Ron	Rancher/Landowner
Toolen, John	CDOW
Van Loan, Jay and Dori	Rancher/Landowner
Wallace, Guy	Utah Division of Wildlife
Yamashita, Steve	CDOW

APPENDIX D

SIGNATURE PAGE

The following parties are interested in the maintenance and enhancement of Gunnison sage grouse on Piñon Mesa. These signatures demonstrate their willingness to preserve Gunnison sage grouse and its habitat on Piñon Mesa to the best of their abilities.

Steve Yamashita, Area 7 Wildlife Manager Colorado Division of Wildlife West Region	Date
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Catherine Robertson, Area Manager Bureau of Land Management Grand Junction Resource Area	Date
--	------

Allan Pfister, Assistant Field Supervisor Department of Interior United States Fish and Wildlife Service	Date
--	------

James Currier, District Conservationist National Resource Conservation Service Grand Junction Field Office	Date
--	------

Utah Division of Wildlife Resources Price, Utah	Date
--	------

Piñon Mesa Gunnison sage grouse partnership member	Date
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Piñon Mesa Gunnison sage grouse partnership member	Date
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Piñon Mesa Gunnison sage grouse partnership member	Date
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Piñon Mesa Gunnison sage grouse partnership member	Date
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APPENDIX E

MALE SAGE GROUSE COUNTS

High Counts of male Gunnison sage grouse, Piñon Mesa, Mesa County, Colorado

Lek Site 2000	1995	1996	1997	1998	1999
Fish Park --	2	+	+	+	+
Luster Basin 6	3	3	7	7	6
Mountain Island --					+
Nelson Creek 5	6	5	4	4	3
Payne Mesa					
5 Lower (north)	1	5	+	+	2
11 Pond	0	8	8	4	8
6 Upper (south)	4	3	4	11	10
Thompson Reservoir NC	0	NC	NC	NC	NC
Totals 33	16	24	23	26	29

+ Notes presence of grouse at leks as observed by sign (droppings, tracks, feathers), but no observation of birds.

-- Notes no presence of grouse noted during count.